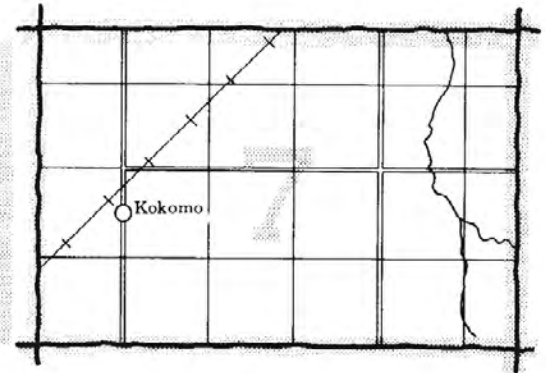
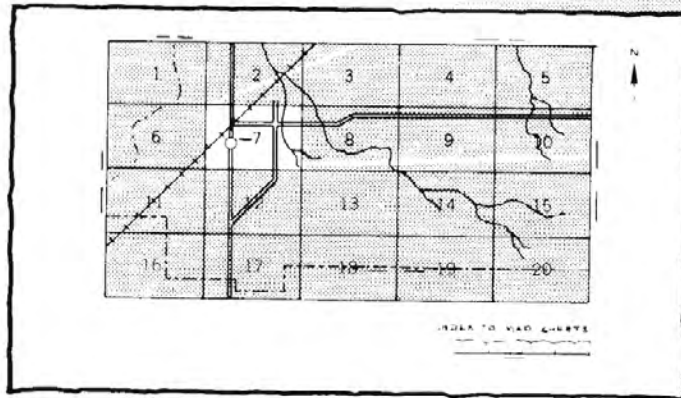
A black and white photograph of a rural landscape. In the foreground, there is a field of dense, low-lying vegetation, possibly palm fronds or similar plants. A wire fence with wooden posts runs across the middle ground. In the background, a line of tall, slender trees, likely pines or cypresses, stands against a light sky. The overall scene is a natural, uncultivated area.

Soil survey of Osceola County Area Florida

**United States Department of Agriculture
Soil Conservation Service
in cooperation with
University of Florida
Institute of Food and Agricultural Sciences and
Agricultural Experiment Stations, Soil Science Department**

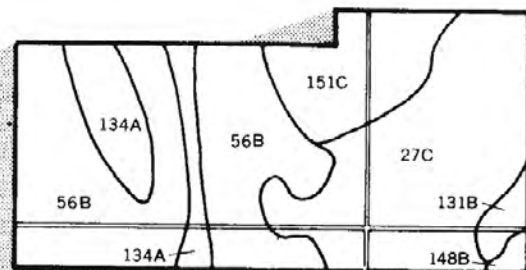
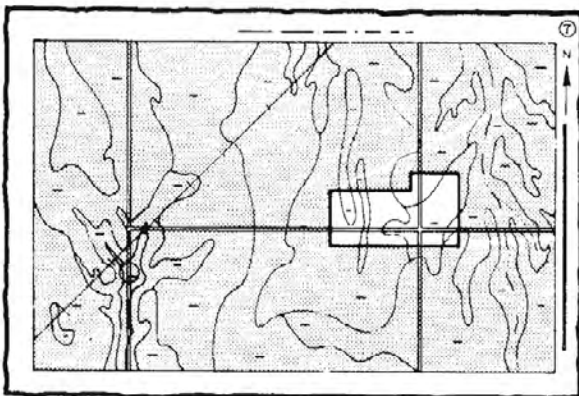
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

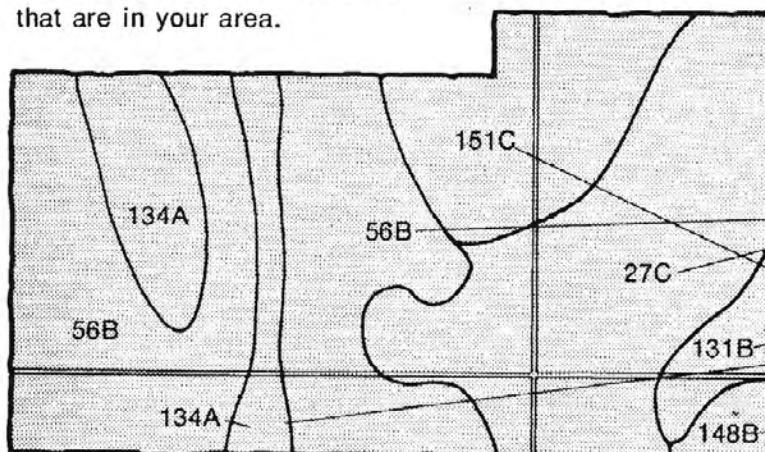


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



4. List the mapping unit symbols that are in your area.



Symbols

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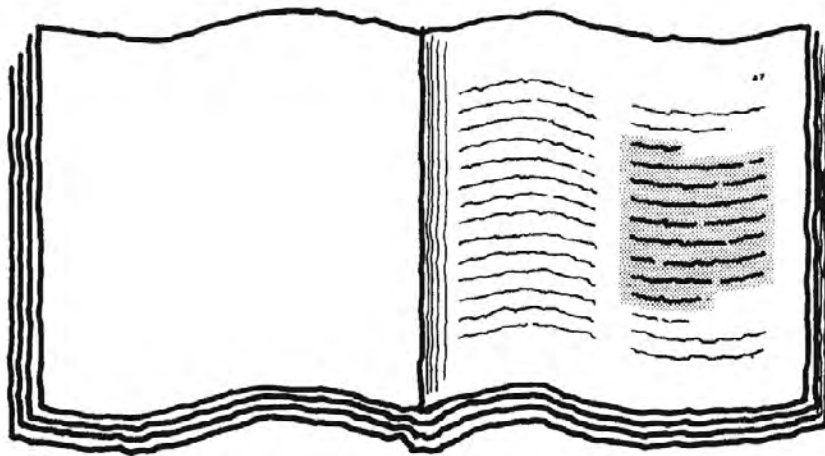
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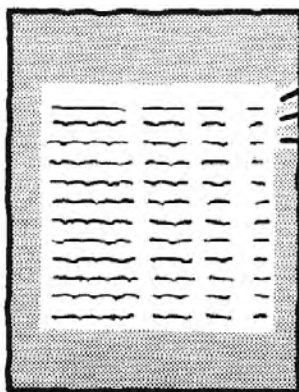
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THIS SOIL SURVEY

5. which lists the name of each mapping unit and the page where that mapping unit is described.

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6. Contents) for location of additional data on a specific soil use.

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Consult "Contents" for parts of the publication that will meet your specific needs.

7.

This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1970-76. Soil names and descriptions were approved in 1976. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1976. This survey was made cooperatively by the Soil Conservation Service and the University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, Soil Science Department. It is part of the technical assistance furnished to the Osceola Soil and Water Conservation District. The Osceola County Board of Commissioners contributed financially to accelerate the completion of fieldwork for the soil survey.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: An area of Myakka fine sand and Immokalee fine sand. The dominant vegetation is longleaf pine, sawpalmetto, and pineland threeawn. A few scrub live oaks are on the low ridge across the center of the picture.

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Foreword

The Soil Survey of Osceola County Area, Florida contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

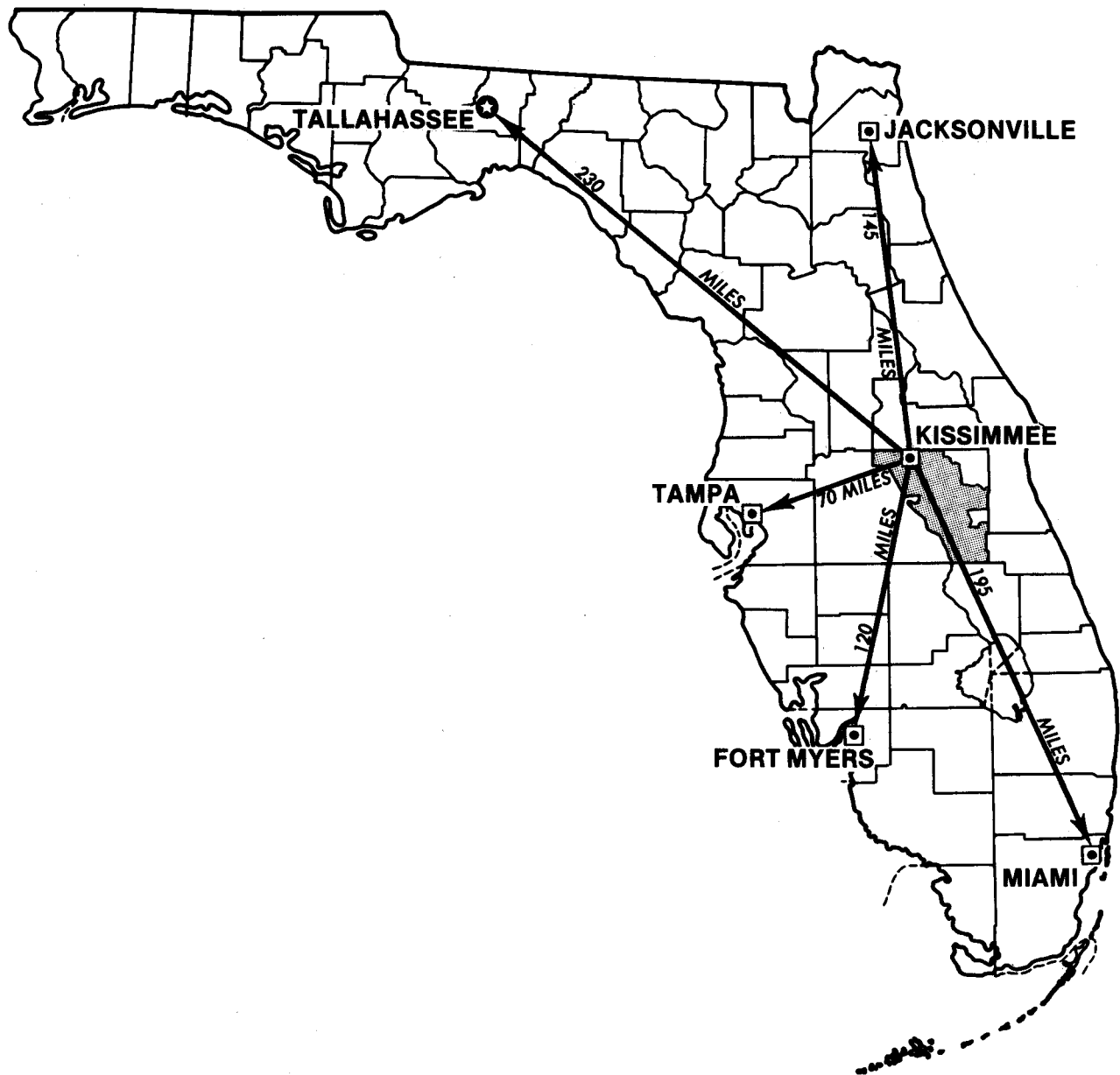
Many people assume that soils are all more or less alike. They are unaware that great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

We believe that this soil survey can help bring us a better environment and a better life. Its widespread use can greatly assist us in the conservation, development, and productive use of our soil, water, and other resources.



William E. Austin
State Conservationist
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State Agricultural Experiment Station at Tallahassee

Location of Osceola County Area in Florida.

SOIL SURVEY OF OSCEOLA COUNTY AREA, FLORIDA

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United States Department of Agriculture, Soil Conservation Service, in cooperation with University of Florida Institute of Food and Agricultural Sciences and Agricultural Experiment Stations, Soil Science Department

OSCEOLA COUNTY AREA is in the central part of peninsular Florida (see map on facing page). It is bordered on the north by Orange County, on the east by Brevard and Indian River Counties, on the south by Okeechobee County, and on the west by Polk County. Lake Kissimmee and the Kissimmee River form part of the boundary between the Osceola County Area and Polk County.

The survey area, which does not include all of Osceola County, covers 662,500 acres, or about 1,035 square miles. The area not surveyed, however, is included in the aerial photographs which are the base for the detailed soil maps at the back of this publication.

The survey area is about 48 miles long; it is 48 miles wide at the widest part and about 16 miles wide at the narrowest part. Kissimmee, the county seat, is in the northwestern part of the survey area. Approximate distances by air from Kissimmee to principal cities in the State are shown on the map on the facing page.

Tourism is the largest single nonagricultural industry in the survey area. The proximity of Kissimmee and the northwestern part of the area to the Walt Disney World recreational complex brings many tourists to the survey area annually.

General nature of the survey area

In this section, environmental and cultural factors that affect the use and management of soils in Osceola County Area are discussed. These factors are climate; history and development; physiography, relief, and drainage; water resources; farming; transportation; and recreation.

Climate

The climate of Osceola County Area is characterized by long, warm, humid summers and mild, dry winters. Average annual rainfall is about 53 inches.

Rainfall is heaviest from June through September. About 57 percent of the annual total falls during this period in an average year. During the summer rainy

season, there is a 50 percent chance of measurable rain on any given day. Warm, moist air from the Atlantic Ocean or the Gulf of Mexico covers the survey area almost continually during summer. This air is very unstable, and when it rises to great heights by convection heat from land surfaces, late afternoon thundershowers occur. These showers are usually local and of short duration, but they can be very heavy; 2 to 3 inches of rain can fall in 1 or 2 hours. Thunderstorms form in large numbers, vary widely in size and intensity, and move across the land with moderate speed. Lightning activity is usually intense in these storms. Hail falls occasionally during thunderstorms, but hailstorms are usually small and seldom cause much damage.

Daylong rains are uncommon. When they do occur, they are usually associated with a tropical storm. Rains in winter and early spring are generally not so intense as summer thunderstorms. Rainfall in excess of 7 inches in a 24-hour period can be expected some time during the year in about 1 year in 10. Summarized climatic data (9, 10) based on records collected at Kissimmee are shown in table 1.

Tropical storms can affect the survey area with their high winds and heavy rainfall, but winds reach hurricane force only about 1 year in 20. These storms can occur at any time during June through mid-November but are most common in August and September. Flooding resulting from these storms can cause considerable damage to crops, roads, and houses.

Temperatures in summer and winter are moderated somewhat by the Atlantic Ocean and the Gulf of Mexico and by the many large lakes in the survey area. Moderation caused by the lakes, however, is limited to areas near the water. This moderation is more pronounced during winter on the southern and southeastern sides of the lakes. The Kissimmee Park community is an example of this. Several subtropical fruits and plants can be grown here that cannot be grown in most other places in the survey area due to cold temperatures.

Freezing temperatures occur when many important crops are growing. Citrus, vegetables, and to a small ex-

tent, improved pasture grasses can be severely damaged if periods of freezing temperatures are prolonged. Daily and day-to-day temperature fluctuation during winter can vary considerably due to invasions of cold, dry continental air from the north. It is not uncommon for temperatures to fall from a daytime high in the seventies to a nighttime low in the thirties with the passing of a cold front, and the coldest temperatures usually occur the second or third night after a cold front passes. Freezing temperatures can be expected several times during winter. These low temperatures occur at night and rarely last more than two or three nights in succession. Freeze data shown in table 2 were taken at Kissimmee and are representative for the area. Because minimum temperatures vary considerably from place to place in winter, freeze data for other points in the county may vary significantly from those shown in table 2.

Summer temperatures vary only slightly from day to day. They are tempered by breezes and frequent formation of cumulus clouds. During June, July, and August, the average daily maximum temperature is about 91 to 93 degrees F, and the average daily minimum is about 70 to 72 degrees. Although temperatures above 100 degrees have been recorded, their occurrence is rare. In July and August, the temperature can be expected to be higher than 90 degrees about 25 days of each month.

Prevailing winds in Osceola County Area are generally southerly in spring and summer and northerly in winter. Wind velocities generally range from 8 to 15 miles per hour during the day but generally drop to about 5 miles per hour at night. Windspeeds are usually highest during April and lowest during August.

History and development (5)

The early recorded history of Osceola County begins with the Spanish explorers who traveled through the area. Historians believe that Hernando de Soto landed near the mouth of the Caloosahatchee River and led his expedition northward, crossing the Kissimmee River into what is now Osceola County at a point about 5 miles north of the southwest corner of the county.

During this early time and later, several tribes of Indians roamed the area, most recently the Seminole tribe. After Florida was acquired from Spain in the early 1800's and became a territory of the United States, settlers were encouraged to come.

The area that is now Osceola County was originally surveyed by the Federal government in 1845, the year that Florida became a State. At that time, it was part of Orange and Mosquito Counties. Osceola County was not established until 1887.

The first settlers were cattlemen who arrived in the area in 1856. In the 1870's settlers began locating at the northwestern edge of Lake Tohopekaliga, which was the site of a trading post. Steadily increasing steamboat traffic on the lake gave impetus to the growth of this settlement, and by 1880, the population was 1,086. This settle-

ment was incorporated into the town of Kissimmee in 1883. By 1925, the population of Kissimmee had grown to 3,823.

In 1883, the railroad came to the area, and a depot was established at Kissimmee. With the railroad came an increasing number of tourists, and the resulting hotel industry prospered for many years.

The earliest commercial ventures in the county were trading posts which bought or traded furs from Indians and other hunters and supplied them with their basic needs. From 1856 to 1865, several settlers arrived and began raising cattle on the broad expanses of open country surrounding Kissimmee. The livestock industry flourished during the Civil War.

Around 1880 an enormous project of canal digging was begun. The canals were to interconnect the major lakes and streams with canals and eventually link the interior of Florida to the Atlantic Ocean and the Gulf of Mexico with navigable waterways. These waterways opened up efficient transportation routes and made possible the drainage of fertile soils that had been covered with water. Commerce and agriculture flourished. Steamboat trade and boat building in Kissimmee grew rapidly. Land drained near St. Cloud was planted to sugar cane, and in 1888 a large sugar mill was erected nearby. The sugar industry persisted until about 1900, when the mill ceased operation and was dismantled.

The cattle industry grew from its inception in the 1850's to the largest agricultural industry in the county. Practices such as routine vat dipping of cattle and burning of native range to control the ticks which caused Texas fever allowed continued expansion of this industry. During the rise of the cattle industry, Brahman cattle were introduced. The bulls of this breed, which were highly resistant to heat and disease, were crossbred with the native cows, and the hardy offspring allowed the cattle industry to thrive and reach the prominence it holds today.

When early settlers arrived in the area, they found sour oranges growing in some of the hammock areas. They procured sweet orange seeds and cuttings to establish citrus groves for their personal use. From these meager beginnings, citrus has become the county's second largest agricultural industry.

Physiography, relief, and drainage

Osceola County Area can be divided into four general parts based on physiography. These are the Lake Wales Ridge, the Osceola Plain, the Okeechobee Plain, and the Eastern Valley (11).

The Lake Wales Ridge is in the extreme northwestern corner of the survey area. It is mostly west of Florida Highway 545 and is roughly U-shaped. Elevations range from about 80 feet to slightly more than 220 feet above sea level. The soils are dominantly excessively drained and sandy, but a few on lower elevations are wet and sandy and have a subsoil that is weakly cemented with

organic matter. The natural vegetation on the excessively drained soils is dominantly mixed oaks and pines and on the wetter soils, pines and sawpalmetto. Much of the citrus grown in the survey area is on this ridge, and in recent years, development for urban uses has increased.

The Osceola Plain lies between the Lake Wales Ridge and the Okeechobee Plain to the west and the Eastern Valley to the east. It is by far the largest physiographic region in the survey area, occupying almost all of it. It extends the entire length of the survey area. Elevations range between 25 and 80 feet above sea level. The vegetation consists mostly of pine and palmetto flatwoods with numerous large to small lakes and fewer areas of broad, grassy sloughs and depressions and poorly defined drainageways. The soils are predominantly nearly level, wet, and sandy. The sandy subsoil is weakly cemented with organic matter. Some of the soils have a loamy subsoil, and some are organic. Large areas of this region are used for range and improved pasture grasses. Extensive urban development has taken place in the Kissimmee and St. Cloud areas.

The Okeechobee Plain is in the southwestern part of the survey area along the Kissimmee River. It extends from the county line northward to Lake Kissimmee. Elevations range from 45 to 55 feet above sea level. The area consists mostly of hardwood and cypress flood plains. Some areas are broad, grassy flats. The soils are nearly level and very wet, and many have a sandy surface layer and a loamy subsoil. Some are organic and are underlain by loamy and clayey mineral material. This area remains mostly in native vegetation. Some areas are used for range and improved pasture.

The Eastern Valley is in the east-central part of the survey area. It is the smallest physiographic region in the survey area. Elevations range from about 25 to 30 feet above sea level. The area consists of broad, grassy flats with occasional cabbage palm trees and hammocks. The soils are predominantly nearly level and wet and have a sandy surface layer and a loamy subsoil. Much of this area is used for range or has been planted to improved pasture grasses.

Most of Osceola County Area is drained through numerous intermittent streams, creeks, closed depressions, lakes, and grassy prairies. The Kissimmee River to the west and the St. Johns River to the east are the principal surface drainageways in the area. Several large creeks such as Crabgrass Creek, Bull Creek, Reedy Creek, and Canoe Creek flow into these rivers. In some areas, intricate systems of canals and ditches provide surface drainage.

Water resources

The Kissimmee River is the major permanent stream in the survey area. Other streams include Crabgrass Creek, Bull Creek, Canoe Creek, Reedy Creek, Davenport Creek, Blue Cypress Creek, and numerous small streams.

The Floridian Aquifer is the primary source of all ground water in central Florida. The shallow aquifers that overlie the Floridian Aquifer, including the surficial sands and the upper region of the Hawthorn Formation, are secondary sources. There are many lakes scattered throughout the survey area. The largest of these are Lake Kissimmee, Lake Tohopekaliga, East Lake Tohopekaliga, Lake Marian, Cypress Lake, Alligator Lake, Lake Gentry, and Lake Hatchineha.

The water supply for the towns, communities, and individual homes within the survey area is from wells. The wells are dug into the underlying limestone to the aquifer and then cased to the limestone.

Farming and ranching

Farming and ranching have always been important to the economy of Osceola County Area. Although the land use patterns are changing, farmers and ranchers have been able to increase yields through both improving management and slightly increasing the farmed acreage.

Beef cattle ranching is the most common farm or ranch activity in the survey area. Field crops are not grown extensively. Those grown are primarily corn and sorghum for silage. Citrus is the most important special crop grown in the survey area. Some of the minor crops are watermelons, hay, and seedling plants of tobacco and tomatoes. Many of the existing improved pastures are important sources of landscaping sod; bahiagrass is the most common grass used for this purpose.

Wood production is important in the survey area. Most trees, particularly slash pine and longleaf pine, are used in the manufacture of pulp for paper. There are about 365,800 acres of woodland in the survey area. Areas of this woodland have varying densities of naturally seeded second, third, and fourth generation trees. There are only a very few planted stands of trees.

Combined value of livestock and crops produced and marketed in 1974 was about 20,000,000 dollars. Of this amount, about 13,000,000 dollars was derived from sale of livestock, and 7,000,000 dollars was derived from sale of citrus and a few other minor crops.

Transportation

Most of Osceola County Area is served by good transportation facilities. Several county, State, and Federal highways provide ready access between population centers within the survey area and between the survey area and the rest of the State. Several trucking firms that have facilities for handling interstate trade serve the survey area. Bus services are available. Scheduled airline services are not available in Osceola County Area, but airline service is readily available at the Orlando Jetport.

Recreation

Nearby Walt Disney World offers outstanding recreational facilities and annually brings thousands of tourists and fun seekers to the survey area. In addition to Walt Disney World, a variety of other recreational activities are available in Osceola County Area. Fishing, hunting, swimming, boating, water skiing, canoeing, and horseback riding are popular. A number of parks and playgrounds with up-to-date facilities are available for public use, and there are several private camping areas in the survey area (fig. 1).

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local

specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The soils in the survey area vary widely in their potential for major land uses. Table 3 shows the extent of the map units shown on the general soil map and gives general ratings of the potential of each, in relation to the other map units, for major land uses. Soil properties that pose limitations to the use are indicated. The ratings of soil potential are based on the assumption that practices in common use in the survey area are being used to overcome soil limitations. These ratings reflect the ease of overcoming the soil limitations and the probability of soil problems persisting after such practices are used.

Each map unit is rated for *community development*, *citrus*, *improved pasture*, and *woodland*.

Soils of the sand ridges

The only map unit in this group consists of nearly level to strongly sloping, excessively drained soils and poorly drained, nearly level soils that are sandy throughout.

Some have thin lamellae of sandy loam at a depth of 40 to 80 inches, and others have weakly cemented sand at a depth of 30 to 50 inches. This unit occurs in the northwestern part of the survey area, generally west of Interstate Highway 4.

1. Candler-Immokalee

Nearly level to strongly sloping, excessively drained and poorly drained soils that are sandy throughout; some have a weakly cemented sandy subsoil at a depth of 30 to 50 inches

This map unit consists mostly of broad, nearly level to gently sloping, deep, sandy soils that are intermingled with steeper soils on hillsides and with nearly level flatwoods soils. These areas contain a few sand-bottom lakes. There are four areas of this unit in the survey area, all in the northwestern part. The largest is about 5 miles wide and is mostly west of Interstate Highway 4.

In areas of Candler soils, the natural vegetation consists of turkey oak, scrub live oak, slash pine, and longleaf pine with an understory of dominantly creeping bluestem, lopsided indiagrass, pineland threeawn, and grassleaf goldaster. Sand pine grows in some places. The natural vegetation on the Immokalee soils is slash pine and longleaf pine with an understory of sawpalmetto, gallberry, running oak, and pineland threeawn.

This unit makes up about 11,500 acres, or about 2 percent of the survey area. It is about 70 percent Candler soils, 10 percent Immokalee soils, and 20 percent soils of minor extent.

Candler soils are excessively drained and occur on the highest elevations. Typically, they are brownish and yellowish sand to a depth of 80 inches or more. Lamellae of reddish yellow loamy sand 1/16 to 1/4 inch thick are below a depth of 62 inches.

Immokalee soils are poorly drained and occur on lower elevations than Candler soils. Typically, they have a surface layer of very dark gray fine sand about 7 inches thick and a subsurface layer of light gray and white fine sand that extends to a depth of 37 inches. The subsoil is black and dark reddish brown fine sand that is weakly cemented with organic matter. Dark brown and dark grayish brown fine sand extend to a depth of 80 inches or more.

Minor soils in this unit are Adamsville, Narcoossee, Paola, and Cassia soils.

Most areas of this unit are used for citrus trees and improved pasture grasses. Only a few areas remain in natural vegetation.

Soils of the low ridges, knolls, and flatwoods

The two map units in this group consist of nearly level to gently sloping, moderately well drained soils and nearly level, poorly drained soils that are sandy throughout. Some have weakly cemented sand above a depth of 30 inches, and others have weakly cemented

sand between depths of 30 and 50 inches. These units are scattered throughout the survey area but are more common in the northern half.

2. Immokalee-Pomello-Myakka

Nearly level to gently sloping, moderately well drained and poorly drained sandy soils that have a weakly cemented sandy subsoil

This map unit consists mostly of flatwoods interspersed with low ridges and knolls and with shallow depressions and poorly defined drainageways. Most areas are east of East Lake Tohopekaliga and Alligator Lake and north of Yeehaw Junction and Kenansville. The largest area is about 7 miles long and 3 to 4 miles wide.

In areas of Immokalee and Myakka soils, the native vegetation is dominantly slash pine and longleaf pine with an understory of sawpalmetto, pineland threeawn, gallberry, and running oaks. Natural vegetation on the Pomello soils is mostly sand live oak and dwarf live oak, sawpalmetto, and scattered longleaf pine and slash pine. Pineland threeawn is the dominant grass. Water-tolerant trees such as baldcypress, sweetgum, and loblolly bay and a wide variety of grasses and sedges grow in the depressions and poorly defined drainageways.

This unit makes up about 39,050 acres, or about 6 percent of the survey area. It is about 36 percent Immokalee soils, 29 percent Pomello soils, 15 percent Myakka soils, and 20 percent soils of minor extent.

Immokalee soils are poorly drained and occur in broad flatwoods areas. Typically, they have a surface layer of very dark gray fine sand about 7 inches thick and a subsurface layer of light gray and white fine sand that extends to a depth of 37 inches. The subsoil is black and dark reddish brown fine sand that is weakly cemented with organic matter. Dark brown and dark grayish brown fine sand extend to a depth of 80 inches or more.

Pomello soils are moderately well drained and are on the low ridges and knolls. Typically, they have a surface layer of gray fine sand about 4 inches thick. The subsurface layer is gray and white fine sand that extends to a depth of 47 inches. The subsoil is about 11 inches of black and dark reddish brown, weakly cemented fine sand. Below is brown and grayish brown fine sand to a depth of 80 inches or more.

Myakka soils are poorly drained and are in broad flatwoods areas similar to Immokalee soils. Typically, they have a surface layer of very dark gray fine sand about 7 inches thick. The subsurface layer is light gray fine sand that extends to a depth of 27 inches. The next layer is a weakly cemented subsoil of black and dark reddish brown fine sand about 10 inches thick. Below is dark yellowish brown and light yellowish brown fine sand that extends to a depth of more than 80 inches.

Minor soils in this unit are Basinger, Cassia, Placid, Pompano, St. Lucie, and Satellite soils.

This unit is primarily used for range. Some areas have been cleared and planted to improved pasture grasses and citrus trees.

3. Myakka-Tavares-Immokalee

Nearly level to gently sloping, moderately well drained and poorly drained soils that are sandy throughout; some have a weakly cemented subsoil

This map unit consists mostly of flatwoods and gently rolling, moderately high ridges interspersed with shallow depressions and poorly defined drainageways. The largest areas are east of St. Cloud and East Lake Tohopekaliga. Another moderate-sized area is west of Kissimmee. A few small areas are scattered throughout the northern third of the survey area.

In areas of Tavares soils, the natural vegetation consists of turkey oak, live oak, slash pine, and longleaf pine with an understory of creeping bluestem, lopsided indian-grass, pineland threeawn, and grassleaf goldaster. In areas of Immokalee and Myakka soils, the native vegetation is dominantly slash pine and longleaf pine with an understory of sawpalmetto, pineland threeawn, gallberry, and running oaks. Water-tolerant trees such as bald-cypress and loblolly bay and a wide variety of grasses and sedges grow in the depressions and poorly defined drainageways.

This unit makes up about 31,300 acres, or about 5 percent of the survey area. It is about 29 percent Myakka soils, 20 percent Tavares soils, 11 percent Immokalee soils, and 40 percent soils of minor extent.

Myakka soils are poorly drained and are in broad flatwoods areas. Typically, they have a surface layer of very dark gray fine sand about 7 inches thick. The subsurface layer is light gray fine sand that extends to a depth of 27 inches. The next layer is a weakly cemented subsoil of black and dark reddish brown fine sand about 10 inches thick. Below is dark yellowish brown and light yellowish brown fine sand that extends to a depth of 80 inches or more.

Tavares soils are moderately well drained and occur on the higher elevations. Typically, the surface layer is dark grayish brown fine sand about 6 inches thick. The next layer is grayish brown, pale brown, and very pale brown fine sand to a depth of about 48 inches. Below is white fine sand that is mottled with brown and yellow and that extends to a depth of 80 inches or more.

Immokalee soils are also poorly drained and occur in broad flatwoods areas similar to those in which Myakka soils occur. Typically, they have a surface layer of very dark gray fine sand about 7 inches thick and a subsurface layer of light gray and white fine sand that extends to a depth of 37 inches. The subsoil is black and dark reddish brown fine sand that is weakly cemented with organic matter. Dark brown and dark grayish brown fine sand extend to a depth of 80 inches or more.

Minor soils in this unit are Adamsville, Delray, Narcoossee, Placid, Pomello, Pompano, Smyrna, and Wauchula soils.

Most of this unit is used for citrus trees. Some areas are used as rangeland or for improved pasture grasses.

Soils of the flatwoods, generally not subject to flooding or ponding

The three map units in this group consist of nearly level, poorly drained soils. Some are sandy throughout and have a weakly cemented, sandy subsoil; some have weakly cemented, sandy layers overlying a loamy subsoil; and some have a loamy subsoil below a depth of 20 inches. These units occur throughout the survey area except for the extreme northwestern corner.

4. Smyrna-Myakka-Immokalee

Nearly level, poorly drained soils that are sandy throughout and have a weakly cemented subsoil

This map unit consists mostly of flatwoods and scattered depressions, low sloughs, and poorly defined drainageways. A few low ridges are scattered throughout these areas. The largest areas are south of St. Cloud and generally east of the Sunshine State Parkway. Smaller areas are east and north of Kissimmee.

Natural vegetation on the dominant soils consists of an open forest of slash pine and longleaf pine with an understory of sawpalmetto, gallberry, running oak, and pineland threeawn. St. Johnswort is the common native vegetation in the depressions; pineland threeawn and scattered pines, in the low sloughs; and cypress and hardwoods, in the poorly defined drainageways.

This unit makes up about 308,160 acres, or about 46 percent of the survey area. It is about 32 percent Smyrna soils, 20 percent Myakka soils, 13 percent Immokalee soils, and 35 percent soils of minor extent.

Smyrna soils are poorly drained and are in broad flatwoods areas. Typically, they have a surface layer of fine sand 7 inches thick. The upper 4 inches is black, and the lower 3 inches is dark gray. The subsurface layer is 7 inches of light gray fine sand. The subsoil is fine sand about 6 inches thick and is weakly cemented with organic matter. The upper 3 inches is black, and the lower 3 inches is dark reddish brown. Next is 5 inches of brown fine sand, 18 inches of light gray fine sand, and 13 inches of grayish brown fine sand. At a depth of about 56 inches is a second subsoil of dark reddish brown and black fine sand that extends to a depth of 80 inches or more.

Myakka soils are poorly drained and are also in broad flatwoods areas. Typically, they have a surface layer of very dark gray fine sand about 7 inches thick. The subsurface layer is 20 inches of light gray fine sand. The subsoil is 10 inches of weakly cemented fine sand. It is black in the upper 6 inches and dark reddish brown and very dark gray in the lower 4 inches. Below is 6 inches of dark yellowish brown fine sand over 27 inches of light yellowish brown fine sand.

Immokalee soils are also poorly drained and occur in very slightly higher flatwoods areas. Typically, they have a surface layer of very dark gray fine sand about 7 inches thick and a subsurface layer of light gray and white fine sand that extends to a depth of 37 inches. The subsoil is

black and dark reddish brown fine sand that is weakly cemented with organic matter. Dark brown and dark grayish brown fine sand extend to a depth of 80 inches or more.

Minor soils in this unit are Basinger, Placid, and Satellite soils.

Large areas of this unit are used as rangeland or grazable woodland. Other large areas are planted to improved pasture grasses. Some areas are used for urban development.

5. EauGallie-Smyrna-Malabar

Nearly level, poorly drained soils; some are sandy throughout and have a weakly cemented subsoil, some have a weakly cemented sandy subsoil and are loamy below, and some are sandy to a depth of more than 40 inches and loamy below

This map unit consists mostly of flatwoods and low, broad sloughs that contain lower depressions. The largest areas are in the southern half of the county.

Natural vegetation on the EauGallie and Smyrna soils consists of an open forest of slash pine and longleaf pine with an understory of sawpalmetto, gallberry, and pineland threeawn. Malabar soils, in broad sloughs, are covered mostly with maidencane, pineland threeawn, and sand cordgrass. St. Johnswort is the most common vegetation in the depressions.

This unit makes up about 105,300 acres, or about 16 percent of the survey area. It is about 38 percent EauGallie soils, 22 percent Smyrna soils, 20 percent Malabar soils, and 20 percent soils of minor extent.

EauGallie soils are in broad flatwoods areas and are poorly drained. Typically, they have a surface layer of black fine sand about 6 inches thick. The subsurface layer is fine sand that is gray in the upper 7 inches and light gray in the lower 10 inches. The subsoil is black fine sand 11 inches thick. Below this is 15 inches of brown fine sand overlying 5 inches of very pale brown fine sand. Next is gray sandy clay loam that extends to a depth of more than 80 inches.

Smyrna soils are also poorly drained and occur in broad flatwoods areas. Typically, they have a surface layer of fine sand about 7 inches thick. This layer is black in the upper 4 inches and dark gray in the lower 3 inches. The subsurface layer is light gray fine sand 7 inches thick. Next is a weakly cemented, fine sand subsoil that is black in the upper 3 inches and dark reddish brown in the lower 3 inches. Next is 5 inches of brown fine sand, 18 inches of light gray fine sand, and 13 inches of grayish brown fine sand. Below a depth of about 56 inches is a second subsoil of dark reddish brown and black fine sand that extends to a depth of 80 inches or more.

Malabar soils are poorly drained and occur on lower positions in the landscape than EauGallie and Smyrna soils. Typically, they have a surface layer of black fine sand 4 inches thick. The subsurface layer is 6 inches of light brownish gray fine sand over 8 inches of pale brown

fine sand. The upper subsoil is fine sand 20 inches thick. The upper 4 inches is light yellowish brown, the next 6 inches is reddish yellow, and the lower 10 inches is yellowish brown. Next is 12 inches of light brownish gray fine sand that separates the upper subsoil from the lower. The lower subsoil is about 18 inches of olive gray sandy clay loam. Below is olive gray sandy loam with pockets of sandy clay loam and sandy loam.

Minor soils in this unit are Basinger and Placid soils.

Most of this unit is used for native range. A few large areas are planted to improved pasture grasses.

6. Riviera-Vero

Nearly level, poorly drained soils that are sandy to a depth of less than 40 inches and loamy below; some have a weakly cemented sandy subsoil

This map unit consists of mostly broad, nearly level, low flats interspersed with shallow depressions and scattered "islands" of slightly higher flatwoods soils. Areas are mostly west of the Sunshine State Parkway and north of Lake Hatchineha.

Natural vegetation on the broad flats consists mostly of scattered slash pines, cabbage palms, sawpalmetto, gallberry, waxmyrtle, and pineland threeawn. In the shallow depressions, the dominant vegetation is cypress, mixed hardwoods, and scattered cabbage palms with an understory of greenbriers, ferns, sedges, and sand cordgrass.

This unit makes up about 22,400 acres, or about 4 percent of the survey area. It is about 75 percent Riviera soils, 20 percent Vero soils, and 5 percent soils of minor extent.

Riviera soils are poorly drained and occur at the lowest elevations. Typically, the surface layer is 6 inches of black fine sand. The subsurface layer is 18 inches of white fine sand. The upper 14 inches of the subsoil is very dark grayish brown sandy clay loam and has tongues of the subsurface layer extending into it. The lower 11 inches is very dark grayish brown sandy clay loam. Below is 12 inches of very dark grayish brown sandy loam over dark gray loamy sand that extends to a depth of 80 inches or more.

Vero soils are also poorly drained and are on the slightly higher flatwoods areas. Typically, the surface layer is fine sand about 10 inches thick. The upper 7 inches is black, and the lower 3 inches is dark gray. The subsurface layer is light gray fine sand about 11 inches thick. The subsoil extends to a depth of 62 inches. It is 3 inches of dark brown fine sand, 4 inches of black fine sand, 4 inches of brown fine sandy loam, 16 inches of light brownish gray sandy clay loam, and 14 inches of gray sandy clay loam. The substratum is greenish gray fine sandy loam and loamy fine sand that extends to a depth of more than 80 inches.

Minor soils in this unit are Wauchula, Winder, and Floridana soils.

Some areas of this unit are used for improved pasture grasses, but most areas remain in natural vegetation and are used for range.

Soils of the swamps, marshes, and very wet areas, generally subject to flooding or ponding

The five map units in this group consist of nearly level, poorly drained and very poorly drained soils. Some are sandy throughout; some have a loamy or clayey subsoil; some are organic and have sandy, loamy, or clayey material within a depth of 51 inches; and some have organic material extending to a depth of more than 51 inches. These units occur throughout the survey area.

7. Malabar-Pompano-Delray

Nearly level, poorly drained and very poorly drained soils; some are sandy throughout, and some are loamy below a depth of 40 inches

This map unit consists mostly of broad, low sloughs, depressions, and margins of large lakes. Areas of this unit occur primarily along the west shore of Lake Kissimmee and southwest of Lake Marian. Most areas are long and narrow.

In areas of Malabar and Pompano soils on broad, low flats and sloughs, the natural vegetation is scattered slash pine and longleaf pines, cabbage palms, sand cordgrass, maidencane, waxmyrtle, and pineland threeawn. Delray soils are usually covered with scattered cypress trees, loblollybay, scattered cabbage palms, maidencane, and pickerelweed. The dominant vegetation in the depressions is St. Johnswort, and in the poorly defined drainageways, various hardwoods and cypress.

This unit makes up about 16,700 acres, or about 2 percent of the survey area. It is about 45 percent Malabar soils, 30 percent Pompano soils, 15 percent Delray soils, and 10 percent soils of minor extent.

Malabar soils are poorly drained and occur mostly in broad sloughs, but some are also in depressions. Typically, they have a surface layer of black fine sand about 4 inches thick. The subsurface layer is 6 inches of light brownish gray fine sand over 8 inches of pale brown fine sand. The upper subsoil is fine sand 20 inches thick. The upper 4 inches is light yellowish brown, the next 6 inches is reddish yellow, and the lower 10 inches is yellowish brown. Next is 12 inches of light brownish gray fine sand that separates the upper subsoil from the lower. The lower subsoil is about 18 inches of olive gray sandy clay loam. Below is olive gray sandy loam with pockets of sandy clay loam and sandy loam.

Pompano soils are poorly drained and also occur in sloughs and depressions. Typically, the surface layer is 12 inches thick. The upper 5 inches is dark gray fine sand, and the lower 7 inches is grayish brown fine sand. The underlying layers are fine sand and extend to a depth of 80 inches or more. The upper 11 inches is light gray, the

next 9 inches is very pale brown, and the lower 46 inches is light gray.

Delray soils are very poorly drained and occur in depressions and at the edges of large lakes. Typically, the surface layer is 14 inches of black loamy fine sand. The subsurface layer is 30 inches of gray fine sand. The subsoil is about 18 inches thick. The upper 6 inches is dark gray fine sandy loam, and the next 12 inches is dark grayish brown sandy clay loam. Below is grayish brown loamy fine sand that extends to a depth of 80 inches or more.

Kaliga soils are the dominant minor soils in this unit.

Most areas of this unit are in native vegetation. A few areas have been planted to improved pasture grasses.

8. Basinger-Placid-Samsula

Nearly level, poorly drained and very poorly drained soils; most are sandy throughout and some have organic layers underlain by sandy layers

This map unit consists mostly of deep, sandy soils in broad sloughs, depressions, and drainageways, and organic soils in marshes and drainageways. Areas of this unit are primarily in the north-central part of the survey area. The largest single area is near Lake Gentry.

Natural vegetation in the broad sloughs and depressions is mostly scattered pond pine, cypress, gum, maidencane, pineland threeawn, waxmyrtle, and pickerelweed. In drainageways, the vegetation is mostly cypress, gum, maple, ash, and greenbriers; and in marshes, it is mostly sawgrass, maidencane, and bulltongue.

This unit makes up about 28,280 acres, or about 4 percent of the survey area. It is about 55 percent Basinger soils, 30 percent Placid soils, 10 percent Samsula soils, and 5 percent soils of minor extent.

Basinger soils are poorly drained and occur in broad, low sloughs and depressions. Typically, the surface layer is black and dark gray fine sand about 7 inches thick. The subsurface layer is light gray fine sand about 12 inches thick. The subsoil is about 16 inches of dark brown fine sand. Below this is 23 inches of light gray fine sand and 22 inches or more of brown fine sand.

Placid soils are in low depressions and drainageways. Typically, the surface layer is 14 inches of black fine sand over 10 inches of very dark gray fine sand. The underlying layers are light brownish gray and light gray fine sand to a depth of 80 inches or more.

Samsula soils are mostly in marshes, but some areas are in swamps. Typically, the surface layer consists of muck. The upper 8 inches is dark reddish brown, and the lower 14 inches is black. Beneath the muck is 17 inches of black fine sand. Grayish brown fine sand extends to a depth of 65 inches or more.

Minor soils in this unit are Nittaw, Kaliga, Gentry, and Floridana soils.

Almost all of this unit is still in natural vegetation. Some areas are used for range, and some have been planted to improved pasture grasses.

9. Kaliga-Nittaw-Gentry

Nearly level, very poorly drained soils; some are muck over clayey material, some are clayey throughout, and some are sandy over loamy material

This map unit consists mostly of organic and clayey soils in drainageways, swamps, and marshes. Most areas of this unit are in the eastern part of the survey area along Bull and Crabgrass Creeks, west and south of Lake Tohopekaliga and Cypress Lake, and along the Kissimmee River. Most areas are long and narrow.

In drainageways and swamps, the vegetation is mostly cypress, sweetgum, maple, bay, tupelo, hickory, and cabbage palms. Some areas are almost all cypress. In marshes and depressions, the dominant vegetation is sawgrass, maidencane, cattails, pickerelweed, and buttonbush.

This unit makes up about 40,660 acres, or about 6 percent of the survey area. It is about 24 percent Kaliga soils, 19 percent Nittaw soils, 8 percent Gentry soils, and 49 percent soils of minor extent.

Kaliga soils are very poorly drained. Typically, the surface layer is muck about 26 inches thick. The upper 7 inches is dark brown, and the lower 19 inches is black. The underlying material extends to a depth of 80 inches or more. It is 6 inches of black loam, 5 inches of very dark gray loamy fine sand, 16 inches of very dark gray clay, 12 inches of very dark gray sandy clay loam, and 15 inches of grayish brown loamy fine sand.

Nittaw soils are also very poorly drained. Typically, the surface layer is 8 inches of black muck. Below it is 13 inches of very dark gray sandy clay, then 24 inches of dark gray sandy clay, and then 19 inches of gray sandy clay. Light gray fine sand extends to a depth of 76 inches or more.

Gentry soils are also very poorly drained. Typically, the surface layer is black fine sand 24 inches thick. The subsoil is gray fine sandy loam about 40 inches thick. The substratum is light gray fine sand and extends to a depth of 80 inches or more.

Minor soils in this unit are Placid, Floridana, Riviera, Winder, Hontoon, and Samsula soils.

Many areas of this unit are still in natural vegetation. Some areas are in improved pasture grasses, and some areas are used for range.

10. Hontoon-Samsula

Nearly level, very poorly drained organic soils; some are organic throughout, and some are sandy within a depth of 51 inches

This map unit consists mostly of organic soils in swamps, and to a lesser extent, in marshes. Most areas are in the northern third of the survey area. Large areas of this unit are in Reedy Creek, Davenport Creek, Cat Island, Big Bend, and Jug Creek Swamps. There are also a few other smaller areas.

Natural vegetation in the swamps is mostly cypress, sweetgum, bay, blackgum, red maple, and swamp ash with

an understory of waxmyrtle, greenbrier, blackberry, titi, and osmunda fern. In marshes, natural vegetation is maidencane, pickerelweed, bulltongue, lilies, and sawgrass.

This unit makes up about 40,090 acres, or about 6 percent of the survey area. It is about 55 percent Hontoon soils, 35 percent Samsula soils, and 10 percent soils of minor extent.

Hontoon soils are very poorly drained. Typically, the surface layer is dark reddish brown muck about 5 inches thick. The next layer is about 24 inches of black muck. Dark reddish brown muck extends to a depth of 70 inches or more.

Samsula soils are also very poorly drained. Typically, the surface layer consists of muck. The upper 8 inches is dark reddish brown, and the lower 14 inches is black. Next is 17 inches of black fine sand. Grayish brown fine sand extends to a depth of 65 inches or more.

Minor soils in this unit are Placid, Kaliga, and Pompano soils.

Most areas of this unit remain in native vegetation. A few areas are used for improved pasture grasses.

11. Pompano

Nearly level, poorly drained soils that are sandy throughout

This map unit is made up of broad swamps and poorly defined drainageways. It occurs in the southeastern part of the survey area along Blue Cypress Creek and Cow Log Branch and in the northwestern part in Reedy Creek Swamp.

Natural vegetation is mostly cypress, sweetgum, bay, blackgum, red maple, cabbage palm, and swamp ash with an understory mostly of greenbrier and blackberry. In a few areas, there are maidencane and St. Johnswort.

This unit makes up about 19,060 acres, or about 3 percent of the survey area. It is about 70 percent Pompano soils and 30 percent soils of minor extent.

Pompano soils are poorly drained. Typically, the surface layer is 12 inches thick. The upper 5 inches is dark gray fine sand, and the lower 7 inches is grayish brown fine sand. The underlying layers are fine sand and extend to a depth of 80 inches or more. The upper 11 inches is light gray, the next 9 inches is very pale brown, and the lower 46 inches is light gray.

The minor soils in this unit are mostly Placid, Delray, Basinger, and Malabar soils.

Most areas of this unit are still in natural vegetation. Some areas are used for range, and some are planted to improved pasture grasses.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in

determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The potential of a soil is the ability of that soil to produce, yield, or support the given structure or activity at a cost expressed in economic, social, or environmental units of value. The criteria used for rating soil potential include the relative difficulty or cost of overcoming soil limitations, the continuing limitations after practices in general use in overcoming the limitations are installed, and the suitability of the soil relative to other soils in Osceola County Area.

A five-class system of soil potential is used. The classes are defined as follows:

Very high potential. Soil limitations are minor or are relatively easy to overcome. Performance for the intended use is excellent. Soils having very high potential are the best in the survey area for the particular use.

High potential. Some soil limitations exist, but practices necessary to overcome the limitations can be installed at reasonable cost. Performance for the intended use is good.

Medium potential. Soil limitations exist and can be overcome with recommended practices; limitations, however, are mostly of a continuing nature and require practices that are more difficult or costly than average. Performance for the intended use ranges from fair to good.

Low potential. Serious soil limitations exist, and they are difficult to overcome. Practices necessary to overcome the limitations are relatively costly compared to those required for soils of higher potential. Necessary practices can involve environmental values and considerations. Performance for the intended use is poor or unreliable.

Very low potential. Very serious soil limitations exist, and they are most difficult to overcome. Initial cost of practices and maintenance cost are very high compared to those of soils with high potential. Environmental values are usually depreciated. Performance for the intended use is inadequate or below acceptable standards.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A

soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. All soils in the United States having the same series name have essentially the same properties that affect their use and management.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Candler sand, 0 to 5 percent slopes, is one of two phases within the Candler series.

Some map units are made up of two or more dominant kinds of soil and are called soil complexes. A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Malabar-Pineda complex is an example.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most survey areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Pits is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

1—*Adamsville sand.* This is a somewhat poorly drained, nearly level soil on narrow ridges adjacent to and slightly higher than sloughs, marshes, and lakes, and on low knolls in the flatwoods. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark gray sand about 4 inches thick. Below this is sand to a depth of 80 inches or more. In sequence from the top of this layer, the upper 12 inches is gray and has pale brown and reddish brown mottles; the next 17 inches is light brownish gray; the next 22 inches is white and has yellow, dark brown, and light brownish gray mottles; and the lower 25 inches is white and has yellow mottles.

Included with this soil in mapping are small areas of Narcoossee, Tavares, Parkwood, and Riviera soils and

small kitchen middens. Also included are small areas of soil having a 4- to 6-inch layer of very pale brown loamy fine sand at a depth of 20 to 40 inches, and small areas of similar soils having a layer of very dark brown to dark grayish brown fine sand at a depth of 70 to 80 inches. Included soils make up no more than 15 percent of any mapped area.

The water table is at a depth of 20 to 40 inches for 2 to 6 months annually. This soil has very low or low available water capacity throughout. Permeability is rapid throughout. Natural fertility and organic matter content are low.

Native vegetation consists dominantly of large live oak trees with laurel and water oaks and longleaf and slash pines. Sawpalmetto, sumac, American beautyberry, greenbriers, Virginia creeper, wild grape, and blackberry are common understory plants. Forbs and grasses are sparse but include partridgeberry, bracken fern, uniolas, pineland threeawn, lopsided indiagrass, and bluestem species.

In its natural state, this soil has severe limitations for vegetables and other cultivated crops because of periodic wetness during the rainy season, lack of soil moisture during the dry season, and low fertility. The number of adapted crops is very limited unless intensive water control measures are used. Potential for crops is low. To realize full potential, a water control system is required that removes excess water in wet seasons and provides subsurface irrigation in dry seasons. Plowing under soil-improving crops and the residues of all other crops increases organic matter content and the level of natural fertility. Fertilizer and lime should be added according to the need of the crop.

Potential for citrus trees is high except in areas subject to frequent freezing temperatures. Installation of a water control system which removes excess water from the soil rapidly to a depth of about 4 feet is needed if this potential is to be reached. Planting the trees on beds lowers the effective depth of the water table. The trees require regular applications of fertilizer, and highest yields require irrigation in seasons of low rainfall.

Potential for improved pasture grasses is medium. A simple water control system is needed to remove excess surface water in times of heavy rainfall. Regular use of fertilizers is needed. Carefully controlled grazing helps maintain healthy plants for highest yields.

This soil has medium potential for longleaf and slash pines. The low fertility of this sandy soil keeps it from being more productive. Slash pines are better suited than other species.

This soil has high potential for septic tank absorption fields, dwellings without basements, small commercial buildings, and local roads and streets. An adequate water control system is needed to realize this potential.

Potential is also high for playgrounds. Surface stabilization is needed.

Potential is medium for trench type sanitary landfills and for shallow excavations. For landfills, the trench needs to be sealed or lined with impervious material; for

excavations, side slopes must be shored and an adequate water control system used.

This soil has low potential for sewage lagoon areas. To realize even this potential, however, the area needs to be sealed and lined with impervious material and an adequate water control system used.

This soil is in capability subclass IIIw and woodland ordination group 3w.

2—Adamsville Variant fine sand, 0 to 5 percent slopes. This is a somewhat poorly drained, nearly level to gently sloping, sandy soil overlying muck. It occurs on long, narrow natural dikes adjacent to and parallel to the shorelines of large lakes. Areas range from about 200 to 300 feet in width and as much as 5 or 6 miles in length.

Typically, the surface layer is dark gray fine sand about 5 inches thick. The next layer is fine sand about 28 inches thick. It is light gray and has pale brown mottles. Next is black, well decomposed muck about 16 inches thick. At a depth of 49 inches is about 4 inches of black fine sand. The underlying layer, which extends to a depth of 80 inches or more, is gray fine sand.

Included with this soil in mapping are small areas of Pompano, Basinger, Placid, Riviera, and Gentry soils. Also included is a similar soil that has another muck layer between depths of 53 and 80 inches. Included soils make up no more than 15 percent of any mapped area.

This soil has a water table at a depth of 20 to 40 inches for 2 to 6 months of most years and between depths of 40 and 60 inches for more than 6 months in most years. During extended dry periods, the water table recedes below a depth of 60 inches. In the sandy layers, available water capacity is very low and permeability is rapid; in the muck layers, available water capacity is very high and permeability is moderate. Organic matter content is low to a depth of 33 inches. Natural fertility is low.

Native vegetation consists dominantly of large live oak trees with laurel and water oaks and longleaf and slash pines. Sawpalmetto, sumac, American beautyberry, greenbriers, Virginia creeper, wild grape, and blackberry are common understory plants. Forbs and grasses are sparse but include partridgeberry, bracken fern, uniolas, pineland threeawn, lopsided indiagrass, and bluestem species.

Potential for vegetables and other cultivated crops is low. In its natural state, this soil has severe limitations for cultivated crops. It is droughty and has low natural fertility. It is often too wet to be tilled during periods of heavy rainfall. A water control system which removes excess water quickly during wet seasons is needed. Irrigation is needed during dry seasons.

Potential for citrus trees is high except in areas subject to frequent or prolonged freezing temperatures. Installation of a water control system which quickly removes excess water to a depth of about 4 feet is required. The trees need regular applications of fertilizer, and for highest yields, irrigation is necessary during dry seasons. Cover crops grown between the trees prevent soil erosion.

Potential for improved pasture grasses is medium. A simple water control system is needed to remove excess surface water. Regular applications of fertilizer and use of adapted grasses such as pangolagrass or improved bahiagrass are required for good yields. Controlling grazing helps maintain healthy plants.

This soil has medium potential for slash pine or longleaf pine. Low natural fertility prevents this soil from being more productive. Slash pines are better suited than other species.

This soil has high potential for septic tank absorption fields, local roads and streets, dwellings without basements, and small commercial buildings. Water control measures are needed to realize this potential. In addition, specially designed footings are needed for dwellings without basements and for small commercial buildings.

Potential is also high for playgrounds; surface stabilization is needed.

Potential is medium for shallow excavations, sewage lagoon areas, and trench sanitary landfills. To realize maximum potential, side walls of shallow excavations need to be shored, sewage lagoon areas need to be sealed and shaped, and trench sanitary landfills need to be sealed. Water control measures are also needed on landfills.

This soil is in capability subclass IIIw and woodland ordination group 3w.

3—Ankona fine sand. This is a poorly drained, nearly level soil on broad flats and low knolls in the flatwoods. Areas range from about 4 to 350 acres. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is fine sand about 9 inches thick. The upper 5 inches is black, and the lower 4 inches is dark gray. The subsurface layer is fine sand about 23 inches thick. The upper 5 inches is gray and has dark gray and grayish brown mottles, and the lower 18 inches is light gray and has very dark gray and dark gray streaks along old root channels. The upper part of the subsoil is loamy sand. It is black to a depth of 36 inches, dark reddish brown to a depth of 40 inches, and dark brown with dark reddish brown mottles and black fragments of subsoil material to a depth of 47 inches. The lower part of the subsoil extends to a depth of 80 inches or more. The upper 4 inches is brown fine sandy loam and has grayish brown, gray, and light brownish gray mottles, and the lower 29 inches is gray sandy clay loam and has light gray and gray mottles.

Included with this soil in mapping are small areas of EauGallie, Immokalee, Myakka, Oldsmar, and Pomona soils. Included soils make up less than 15 percent of any mapped area.

This soil has a water table within a depth of 10 inches for 2 to 4 months and at a depth of 10 to 40 inches for 6 months or more during the season of low rainfall. Available water capacity is very low in the surface and subsurface layers and medium in the subsoil. Permeability is rapid in the surface and subsurface layers, moderately slow to very slow in the cemented portion of the subsoil,

and moderate to moderately rapid below. Natural fertility and organic matter content are low.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses are creeping bluestem, chalky bluestem, lopsided indiagrass, pineland threeawn, switchgrass, and several panicum species.

This soil has severe limitations for cultivated crops because of wetness and low fertility. Potential for several adapted vegetables is medium. To realize this potential, water control measures which quickly remove excess water after heavy rainfall are needed. Good management practices, which include regular fertilization and irrigation during the dry season, are also needed. Crop residues and soil-improving crops should be plowed under. Seedbed preparation that includes bedding of rows lowers the effective depth of the water table.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses are creeping bluestem, chalky bluestem, lopsided indiagrass, pineland threeawn, switchgrass, and several panicum species.

This soil has low potential for citrus trees. It is too wet in its natural state for this use. In order to reach its potential, installation of a water control system which lowers the seasonal high water table to a depth of at least 48 inches is needed. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the trees reduces erosion.

Potential for improved pasture grasses is medium. Coastal bermudagrass, pangolagrass, improved bahiagrass, and several legumes such as white clover are suitable for planting. Water control measures which quickly remove excess surface water during the wet season are needed. Regular applications of fertilizer and lime and controlled grazing help maintain satisfactory production.

Potential for pine trees is low. Slash pines are better suited than other species. Simple water control measures are needed to remove excess surface water. Planting the trees on beds lowers the effective depth of the water table.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, trench sanitary landfills, and shallow excavations. Adequate water control practices are needed to realize this potential. In addition, mounding may be needed for septic tank absorption fields in some places; sealing or lining with impervious material is needed for sewage lagoon areas and trench sanitary landfills; surface stabilization is needed for playgrounds; and shoring of side walls is needed for shallow excavations.

This soil is in capability subclass IVw and woodland ordination group 4w.

4—Arents, 0 to 5 percent slopes. These are somewhat poorly drained, nearly level to gently sloping soils that have been reworked and shaped by earthmoving equip-

ment. Areas are throughout the county in both urban and rural areas. Most of the areas are low and are adjacent to the ponds and canals from which the soil material was excavated. Individual areas range from about 3 to 600 acres. They are circular in some areas and elongated in areas adjacent to canals.

Arents have no orderly sequence of layers. They consist dominantly of sandy mineral material that contains fragments, lenses, or streaks of former subsoils. They are highly variable within short distances. Depth of fill material ranges from 20 to more than 80 inches. The water table is at a depth of 20 to 60 inches. Available water capacity and permeability are variable.

A few areas of this soil, primarily along canal C-38, are 30 to 50 percent shells and carbonatic material. Included with this soil in mapping are areas used as trench type sanitary landfills (fig. 2). Solid waste materials such as plastic, wood, paper, metal, or glass comprise 50 to 80 percent of these areas.

These soils vary so widely in their physical and chemical properties that their potential for cultivated crops, citrus, or improved pasture also varies widely. Potential for these uses depends upon the thickness of the fill and upon the source of the soil material used as fill. The thickness of the fill material directly affects whether or not a water control system will be required. Such soil properties as natural fertility and availability of soil moisture for plant use are influenced by the kind of soil material used for fill.

This soil is in capability subclass IIIw and woodland ordination group 4s.

5—Basinger fine sand. This is a poorly drained, nearly level soil in low, broad flats and sloughs in the flatwoods. Areas of this soil are elongated in most places and range from about 4 to 300 acres. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is about 4 inches of black fine sand over 3 inches of dark gray fine sand that contains gray mottles. The subsurface layer is 12 inches of light gray fine sand that contains dark brown and light brownish gray mottles. Next is about 16 inches of dark brown fine sand that contains dark grayish brown mottles and black and dark reddish brown bodies of weakly cemented fine sand. The substratum is fine sand to a depth of 80 inches or more. It is light gray in the upper 23 inches and brown in the lower 22 inches and has brown and very dark grayish brown mottles.

Included with this soil in mapping are small areas of Placid, Pompano, and Smyrna soils. Also included are small areas of a similar soil overlain by 5 to 9 inches of peat or muck. Some areas are as much as 5 percent a soil that is similar to Basinger soils but that has a 3- to 8-inch layer of brown, iron-cemented sand containing common small iron concretions. Also included are small areas of similar soils, some of which have a sandy loam layer at a depth of about 45 to 55 inches, and some of which have a black or dark reddish brown layer of weakly cemented fine sand at a depth of 68 to 76 inches. Included soils make up less than 20 percent of any mapped area.

The soil has a water table at a depth of less than 10 inches for 2 to 6 months during most years and at a depth of 10 to 30 inches during the dry season in most years. In extended dry periods, the water table drops below a depth of 40 inches. Permeability is very rapid throughout. Available water capacity, natural fertility, and organic matter content are low to very low.

Native vegetation consists mostly of grasses with scattered longleaf pines, sawpalmetto, and waxmyrtle. Grasses include maidencane, pineland threeawn, chalky bluestem, Florida threeawn, low panicums, and sand cordgrass.

Under natural conditions, this soil has very severe limitations for cultivated crops because of wetness and low fertility. The number of adapted crops is limited unless very intensive management practices are followed. With good water control measures and soil-improving measures, however, this soil has medium potential for a number of vegetables. A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus trees in its natural condition. It has low potential for trees, and then only after a carefully designed water control system has been installed to maintain the water table below a depth of about 4 feet. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between rows reduces erosion. Regular applications of fertilizer and lime are needed.

Potential is medium for improved pasture grasses. Pangolagrass, improved bahiagrass, and white clovers grow well when well managed. A water control system that removes excess surface water after heavy rainfall is needed. Regular applications of fertilizer and lime are needed, and controlled grazing helps prevent overgrazing and weakening of plants.

This soil has low potential for longleaf and slash pines. A water control system to remove excess surface water is necessary if the potential productivity is to be realized. Seedling mortality and equipment limitations are the main management concerns. Slash pines are better suited than other species.

This soil has medium potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, and shallow excavation. Water control measures are needed to realize full potential. In addition, absorption fields need to be mounded, the surfaces of playgrounds need to be stabilized, and side walls of excavations need to be shored.

Potential is low for sanitary landfills and sewage lagoon areas. To realize even this potential, however, water control measures are needed, and areas need to be sealed or lined with impervious material.

This soil is in capability subclass IVw and woodland ordination group 4w.

6—Basinger fine sand, depressional. This is a poorly drained, nearly level soil in shallow depressions and poorly defined drainageways in the flatwoods. Areas of this soil are circular or elongated in most places and generally range from about 4 to 190 acres. Slopes are flat to concave and range from 0 to 2 percent.

Typically, the surface layer is about 4 inches of black fine sand over 3 inches of dark gray fine sand that contains gray mottles. The subsurface layer is 12 inches of light gray fine sand that contains dark brown and light brownish gray mottles. Next is about 16 inches of dark brown fine sand that contains dark grayish brown mottles and black and dark reddish brown fragments of weakly cemented fine sand. The substratum is fine sand to a depth of 80 inches or more. It is light gray in the upper 23 inches and brown in the lower 22 inches and contains brown and very dark grayish brown mottles.

Included with this soil in mapping are small areas of Myakka, Placid, Pompano, and Smyrna soils. Also included is a similar soil which differs from Basinger soils by having 5 to 9 inches of peat or muck on the surface. Included soils make up less than 20 percent of any mapped area.

Water stands on the surface for 6 to 12 months during most years. Permeability is very rapid throughout. Available water capacity, natural fertility, and organic matter content are low to very low.

Native vegetation is dominantly water-tolerant grasses and small woody shrubs, but in some places the native vegetation is swamp. In the open areas, native vegetation occurs as circular bands. The small areas of very wet soils that occur within the unit generally support sawgrass, maidencane, cutgrass, and pickerelweed. Outward from the center are smaller amounts of maidencane in association with St. Johnswort. Sand cordgrass, low panicum, stiff paspalum, and species of nut rushes are also common. In the swamps, cypress, blackgum, tupelo gum, red-bay, loblollybay, and red maple trees are dominant.

Under natural conditions, this soil is not suitable for cultivated crops or improved pastures. Potential for crops or pasture is very low because water stands on the surface for long periods. An adequate drainage system is difficult to establish in many places because suitable outlets are not available. In its native state, this soil provides watering places and feeding grounds for many kinds of wading birds and other wetland wildlife.

This soil has low potential for pine trees. A good water control system to remove surface water is necessary if the potential is to be realized. Pond pine is better suited than other species.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even this potential, however, water control measures are needed, and fill material needs to be added. In addition, absorption fields need to be mounded and the surfaces of playgrounds stabilized.

Potential is very low for trench sanitary landfills and sewage lagoons even where standing surface water and

the water table are controlled and special equipment is used. Potential for shallow excavations is also very low even where standing surface water and the water table are controlled and side walls are shored.

This soil is in capability subclass VIIw and woodland ordination group 4w.

7—Candler sand, 0 to 5 percent slopes. This is an excessively drained, nearly level to gently sloping soil on uplands. Mapped areas range from about 20 to 225 acres.

Typically, the surface layer is dark grayish brown sand about 3 inches thick. The subsurface layer is sand to a depth of about 62 inches. In sequence from the top of this layer, the upper 3 inches is yellowish brown, the next 11 inches is brownish yellow, the next 18 inches is light yellowish brown, and the next 27 inches is brownish yellow. Below a depth of 62 inches is brownish yellow sand containing lamellae of reddish yellow loamy sand about 1/16 to 1/4 inch thick and 2 to 6 inches long.

Included with this soil in mapping are small areas of Pomello, Cassia, and Tavares soils and small areas of Candler soils having slopes of 5 to 12 percent. Also included are similar soils that have a loamy subsoil within 80 inches of the surface and other soils which lack lamellae within the same depth. Included soils make up no more than about 15 percent of any mapped area.

The water table in this soil is at a depth of more than 72 inches, and no flood hazard exists. Available water capacity is very low in the upper 62 inches and low below that depth. Permeability is very rapid in the upper 62 inches and rapid below. Organic matter content and natural fertility are low.

Turkey oak and longleaf pine are the major tree species. Dominant native grass species include creeping bluestem, indiagrass, grassleaf goldaster, and pineland threeawn. Other common plants are gopher apple, pricklypear, and a variety of legumes.

Potential for cultivated crops is very low because of low fertility. Intensive soil management practices are needed when the soil is cultivated. Droughtiness and rapid leaching of plant nutrients reduce the variety of adapted crops and potential yields of adapted vegetables. Soil-improving crops and all crop residue should be left on the ground or plowed under. Although only a few crops produce good yields without irrigation, irrigation is usually feasible where water is readily available.

Potential for citrus trees is high in places relatively free from freezing temperatures (fig. 3). A good ground cover of close-growing plants is needed between the trees to protect the soil from blowing. Good yields can be obtained some years without irrigation, but a well designed irrigation system to maintain optimum moisture content is needed to assure best yields.

Potential for improved pasture grasses is very low. Deep-rooting plants such as Coastal bermudagrass and bahiagrass are well adapted, but yields are reduced by periodic droughtiness. Regular fertilization and liming are needed. Controlled grazing permits plants to recover from grazing and to maintain vigor.

Potential for commercial production of pine trees is low. Because of the sandy nature of the soil, the establishment of seedlings and the movement of equipment are concerns in managing the tree crop. Sand pine and slash pine are better suited than other species.

This soil has very high potential for septic tank absorption fields, dwellings without basements, small commercial buildings, and local roads and streets. Because of excessive permeability, however, onsite disposal of sewage can create a hazard of pollution of ground water around septic tank absorption fields. No corrective measures are needed for dwellings without basements, small commercial buildings, and local roads and streets.

This soil has high potential for trench sanitary landfills, sewage lagoon areas, and shallow excavations. To realize maximum potential, trench sanitary landfills and sewage lagoon areas need to be sealed or lined with impervious material, and side walls of shallow excavations need to be shored.

Potential for playgrounds is medium. Land shaping and surface stabilization are needed.

This soil is in capability subclass IVs and woodland ordination group 4s.

8—Candler sand, 5 to 12 percent slopes. This is an excessively drained, sloping to strongly sloping soil on uplands. Areas range from about 20 to 175 acres.

Typically, the surface layer is dark grayish brown sand about 7 inches thick. It is underlain by 52 inches of sand. The upper 21 inches is pale brown, and the lower 31 inches is yellow and contains many uncoated, white sand grains. Below a depth of 59 inches and extending to a depth of 80 inches or more is very pale brown sand that contains light gray and white mottles and lamellae of brownish yellow sandy loam 1/16 to 1/4 inch thick and 1 to 4 inches long.

Included with this soil in mapping are small areas of Candler sand having slopes of 0 to 5 percent. Included soils make up no more than 10 percent of any mapped area.

The water table is at a depth of more than 72 inches. Available water capacity is very low in the upper 59 inches and low below that depth. Permeability is very rapid in the upper 59 inches and rapid below. Organic matter content and natural fertility are very low.

Turkey oak and longleaf pine are the major tree species. Dominant native grass species include creeping bluestem, indiagrass, grassleaf goldaster, and pineland threeawn. Other common plants are gopher apple, pricklypear, and a variety of legumes.

This soil has very low potential for cultivated crops because of droughtiness, rapid leaching of plant nutrients, and strong slopes. It is not suitable for most commonly grown vegetables.

Potential for citrus trees is medium. Good yields of fruit can be obtained some years without irrigation, but best yields are obtained in irrigated areas.

Potential for improved pasture grasses is low even if good management practices are used. Grasses such as

Coastal bermudagrass and bahiagrasses are best adapted. Clovers are not adapted. Yields are reduced by periodic droughts. Regular fertilizing and liming are needed. Restricting grazing permits plants to maintain vigorous growth for highest yields and to provide good ground cover.

Potential is low for commercial production of pine trees. Sand pine and slash pine are better suited than other species. Seedling mortality and limited mobility of equipment are the major management concerns for commercial tree production.

This soil has very high potential for septic tank absorption fields, dwellings without basements, and local roads and streets. Because of excessive permeability, however, onsite disposal of sewage can create a hazard of pollution of ground water. To realize maximum potential, dwellings need to be designed to fit the slope. No corrective measures are needed for local roads and streets.

This soil has high potential for trench sanitary landfills and for small commercial buildings. For full potential, the land needs to be shaped. In addition, landfills must be sealed or lined with impervious material and buildings designed to fit the slope.

Potential is medium for shallow excavations and playgrounds. To realize this potential, the land needs to be shaped. Additionally, side walls of excavations must be shored and the surfaces of playgrounds stabilized.

Potential is low for sewage lagoons. To realize even this potential, however, the area must be sealed or lined with impervious material and the land shaped.

This soil is in capability subclass VIs and woodland ordination group 4s.

9—Cassia fine sand. This is a somewhat poorly drained, nearly level soil on low ridges in the flatwoods. Areas range from less than 10 acres to about 185 acres. They are irregularly shaped, rounded to elongated. Slopes range from 0 to 2 percent.

Typically, the surface layer is gray fine sand about 3 inches thick. The subsurface layer is white fine sand about 17 inches thick; it has light brownish gray mottles and streaks along root channels. The subsoil is weakly cemented loamy fine sand and fine sand about 8 inches thick. It is dark reddish brown in the upper 5 inches and reddish brown in the lower 3 inches. The next layer, between depths of 28 and 53 inches, is yellowish brown fine sand. Next is 12 inches of dark brown and dark reddish gray loamy fine sand that contains weakly cemented bodies of black fine sand. The next layer is weakly cemented, black fine sand that extends to a depth of more than 80 inches.

Included with this soil in mapping are small areas of Myakka and Pomello soils. Also included are small areas of similar soils that have a thin, very dark gray surface layer and a few other areas which have a loamy layer below a depth of 40 inches. Included soils make up less than 10 percent of any mapped area.

The water table is at a depth of 15 to 40 inches for about 6 months in most years but drops to a depth of

more than 40 inches during dry periods. Flooding is not a hazard. Permeability is rapid in the surface and subsurface layers, moderate to moderately rapid in the subsoil, and rapid in the substratum. Available water capacity is very low in the surface and subsurface layers, medium in the subsoil, and low in the substratum. Natural fertility and organic matter content are low.

Natural vegetation consists of scattered sand pine, longleaf pine, and slash pine. Sand live oaks form dense thickets in many places. A few sawpalmetto are in most mapped areas. Pineland threeawn is the major grass, and creeping bluestem, lopsided indiagrass, and low panicums also grow in these areas. Running oak is common.

This soil has very low potential for cultivated crops because of droughtiness and rapid leaching of plant nutrients. It is not suitable for most commonly grown vegetables.

Potential for citrus trees is low. Very low natural fertility and droughtiness result in poor soil quality. Irrigation and regular application of fertilizer are required to reach full potential.

Potential for improved pasture grasses is low even if good management practices are used. Grasses such as bahiagrass are best adapted. Clovers are not adapted. Yields are reduced by periodic droughts. Regular fertilizing and liming are needed. Greatly restricting grazing permits plants to maintain vigorous growth for highest yields and to provide good ground cover.

Potential is low for commercial production of pine trees. Sand pines are better suited than other species. Seedling mortality, mobility of equipment, and plant competition are the major management concerns for commercial tree production.

This soil has medium potential for septic tank absorption fields, dwellings without basements, small commercial buildings, and shallow excavations. Water control measures are needed to realize this potential. In addition, side walls of shallow excavations need to be shored.

Potential for sewage lagoon areas and trench sanitary landfills is low. To realize even this potential, however, water control measures are needed, and the areas must be sealed with impervious material.

This soil is in capability subclass VIs and woodland ordination group 4s.

10—Delray loamy fine sand. This is a very poorly drained nearly level soil in depressions in the flatwoods and at the edges of large lakes that have fluctuating water levels. Mapped areas range from 4 to 450 acres and are circular to irregularly shaped. Slopes range from 0 to 2 percent.

Typically, the surface layer is about 14 inches of black loamy fine sand. The subsurface layer is 30 inches of gray fine sand. The upper 6 inches of the subsoil is dark gray fine sandy loam mottled with pale brown, and the next 12 inches is dark grayish brown sandy clay loam that has yellowish brown mottles. Below a depth of 62 inches and extending to a depth of 80 inches or more the subsoil is

grayish brown loamy fine sand mottled with brownish yellow.

Included with this soil in mapping are small areas of Floridana, Holopaw, and Kaliga soils. Also included are small areas of a similar soil in which the subsoil is below a depth of 80 inches. Included soils make up less than 15 percent of any mapped area.

Water stands on the surface for 2 to 6 months in most years and is within a depth of 10 inches for 6 to 9 months in most years. Available water capacity is medium in the surface layer, low in the subsurface layer, medium in the subsoil, and low in the substratum. Permeability is rapid in the surface and subsurface layers and moderate to moderately rapid in the subsoil and substratum. Natural fertility and organic matter content are moderate.

Native vegetation consists mainly of maidencane, sand cordgrass, pickerelweed, giant cutgrass, waxmyrtle, sedges, and rushes. There are scattered cypress, bay, tupelo, and cabbage palm trees in many areas.

Under natural conditions, this soil is unsuitable for cultivated crops because of excessive wetness and the water which stands on the surface for long periods. In most places, suitable drainage outlets are not available. Even where outlets are available and water control systems which remove excess water are installed, this soil has low potential for vegetable crops. Seedbed preparation which includes bedding of the rows lowers the effective depth of the water table.

This soil is not suitable for citrus trees unless it is drained. Potential for this use is low. Well designed water control systems which lower the seasonal high water table to a depth of about 4 feet are required to realize full potential. Planting the trees on beds lowers the effective depth of the water table. The trees need regular fertilization. Areas susceptible to frequent or prolonged freezing temperatures are not suitable.

Under natural conditions, this soil is too wet for improved pasture grasses. The water which stands on the surface much of the year severely restricts plant growth. An adequate water control system is difficult to establish because in most places suitable outlets are not available. Where such a system can be installed, however, this soil has high potential for production of improved pasture grasses.

Potential for pine trees is high. A good water control system designed to remove excess surface water is needed before trees can be planted.

This soil has low potential for sewage lagoon areas, septic tank absorption fields, trench sanitary landfills, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even low potential, a water control system designed to lower the inherent high water table is needed. In addition, the following practices are needed. For sewage lagoon areas, surface water needs to be controlled. For septic tank absorption fields, fill material needs to be added and the field mounded. For trench sanitary landfills, surface water needs to be controlled. For dwellings without base-

ments and small commercial buildings, fill material needs to be added. For local roads and streets, fill material needs to be added and specially designed foundations used. For playgrounds, fill material needs to be added and the surface stabilized.

Potential is very low for shallow excavations. This potential would not improve even if water control systems were used to lower the water table and control surface water and if side walls were shored.

This soil is in capability subclass VIIw and woodland ordination group 2w.

11—EauGallie fine sand. This is a poorly drained, nearly level soil in the flatwoods. Areas range from about 5 to 850 acres and are circular to irregularly shaped. Slopes range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 6 inches thick. The subsurface layer is fine sand about 17 inches thick. It is gray in the upper 7 inches and light gray in the lower 10 inches, and it contains very dark gray, grayish brown, and dark reddish brown mottles. The upper subsoil, 11 inches thick, is black fine sand that is coated with organic matter and that has dark brown mottles. Below this is 15 inches of brown fine sand that has dark brown mottles and 5 inches of very pale brown fine sand. The lower subsoil is gray sandy clay loam that has olive gray stains along old root channels. It extends to a depth of more than 80 inches.

Included with this soil in mapping are small areas of Myakka, Vero, Smyrna, Oldsmar, Immokalee, Basinger, and Malabar soils. Included soils make up less than 15 percent of any mapped area.

This soil has a water table within 10 inches of the surface for periods of 1 to 4 months and within a depth of 40 inches for more than 6 months. Available water capacity is very low in the surface and subsurface layers; low in the upper, sandy subsoil; very low in the sandy layers beneath the upper subsoil; and medium in the lower subsoil. Permeability is rapid in the surface and subsurface layers; moderate to moderately rapid in the upper subsoil; rapid in the sandy layers beneath the upper subsoil; and moderate to moderately rapid in the lower subsoil. Natural fertility and organic matter content are low.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses on this soil are creeping bluestem, chalky bluestem, lopsided indiagrass, pineland threeawn, switchgrass, and several panicum species.

This soil has very severe limitations for cultivated crops because of wetness and low fertility. Adapted crops are limited unless very intensive management practices are followed. The soil has medium potential for a number of vegetables. A water control system is needed to remove excess water in the wet seasons and provide water for subsurface irrigation in dry seasons. Crop residues and soil improving crops should be plowed under. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

Potential for citrus trees on this soil is low, but even then only after a carefully designed water control system that maintains the water table below a depth of 4 feet has been installed. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between rows reduces erosion. Areas subject to freezing temperatures in winter are not suitable for citrus trees.

Potential for improved pasture grasses on this soil is medium. Pangolagrass, improved bahiagrass, and white clover grow well when well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and controlled grazing helps prevent overgrazing and weakening of the plants.

Potential for pine trees is medium. Slash pines are better suited than other species. The main management concerns are equipment limitations during periods of heavy rainfall, seedling mortality, and plant competition. For best results, a simple water control system is needed to remove excess surface water.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, trench sanitary landfills, dwellings without basements, small commercial buildings, local roads and streets, shallow excavations, and playgrounds. Adequate water control measures are needed to realize this potential. In addition, mounding may be needed for septic tank absorption fields in some places; sealing or lining with impervious material, for sewage lagoon areas and trench sanitary landfills; surface stabilization, for playgrounds; and shoring of side walls, for shallow excavations.

This soil is in capability subclass IVw and woodland ordination group 3w.

12—Floridana fine sand. This is a very poorly drained, nearly level soil in depressions in the flatwoods and at the edges of large lakes that have fluctuating water levels. Areas range from about 4 to 250 acres and are circular to irregularly elongated. Slopes range from 0 to 2 percent.

Typically, the surface layer is fine sand about 15 inches thick. It is black in the upper 10 inches and very dark gray in the lower 5 inches. The subsurface layer, about 9 inches thick, is grayish brown fine sand that has brownish yellow mottles. The subsoil is 24 inches thick. The upper 8 inches is light brownish gray sandy clay loam that has brown and yellowish brown mottles, and the next 9 inches is gray sandy clay loam that contains lenses of light gray fine sand. The lower 7 inches is gray sandy loam that has dark gray and yellowish brown mottles. The substratum is white sand that extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Delray, Gentry, Kaliga, and Nittaw soils. Also included are small areas of similar soils that have a thin, organic surface layer and some areas of soils on low, broad flats that are subject to flooding. Included soils make up less than 15 percent of any mapped area.

Water stands above the surface for more than 6 months in most years and is within a depth of 10 inches for 9 months or more in most years. Available water capacity is medium in the surface layer, low in the sub-surface layer, medium in the subsoil, and low in the substratum. Permeability is rapid in the surface and subsurface layers, slow to very slow in the subsoil, and rapid in the substratum. Natural fertility and organic matter content are moderate.

Native vegetation consists mainly of maidencane, sand cordgrass, pickerelweed, giant cutgrass, waxmyrtle, sedges, and rushes. There are scattered cypress, bay, tupelo, and cabbage palm trees in many areas.

Under natural conditions, this soil is unsuitable for cultivated crops because water stands on the surface for long periods. Drainage outlets are not available in many places. Even where adequate outlets are available and a water control system which quickly removes excess water is installed, this soil has low potential for vegetables. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

This soil is too wet in its natural state for citrus trees. Potential for this use is low. A water control system which lowers the water table to a depth of 4 feet is required before citrus trees can be grown on this soil. Planting the trees on beds lowers the effective depth of the water table. Areas subject to frequent and prolonged freezing temperatures are not suitable for citrus.

Under natural conditions, this soil is unsuitable for improved pasture. The water table, which is above the surface for long periods, severely restricts plant growth. Adequate water control systems are difficult to establish because in most places suitable outlets are not available. If a water control system can be installed, however, the potential production of good quality pasture is high.

This soil has medium potential for longleaf and slash pines, but a water control system that removes excess water is needed before trees can be planted.

This soil has low potential for sewage lagoon areas, septic tank absorption fields, trench sanitary landfills, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. Even this potential cannot be realized, however, until a water control system that lowers the depth of the water table is installed. In addition, in areas used as sewage lagoons and trench sanitary landfills, standing water needs to be controlled. Fill material needs to be added in areas used for dwellings without basements and small commercial buildings. The addition of fill material and mounding are needed in areas used as septic tank absorption fields. Fill material needs to be added and the structural strength of foundations increased in areas used for roads and streets. Fill material needs to be added and the surface stabilized in areas used as playgrounds.

Potential is very low for shallow excavations. To reach even this potential, water control systems are needed to remove water standing on the surface and to lower the high water table, and side walls need to be shored.

This soil is in capability subclass VIIw and woodland ordination group 3w.

13—Gentry fine sand. This is a very poorly drained, nearly level soil in narrow to broad drainageways, on flood plains, and in small depressions in the flatwoods. Mapped areas are mostly elongated flood plains or drainageways, and a few are small, circular depressions. These areas range from about 3 to 100 acres. Slopes are dominantly less than 1 percent but range to 2 percent.

Typically the surface layer is black fine sand about 24 inches thick. It has high organic matter content and contains very dark gray mottles and light brownish gray pockets of uncoated sand grains. The subsoil is gray fine sandy loam about 40 inches thick. In the upper 13 inches, it contains very dark gray, gray, and yellowish brown mottles; very dark gray tongues of fine sand; and light gray pockets of fine sand. In the lower 27 inches, it contains dark gray and brownish yellow mottles and grayish brown and light gray pockets of fine sand. The substratum extends to a depth of 80 inches or more. It is light gray fine sand and has yellow and light gray mottles.

Included with this soil in mapping are small areas of Delray, Floridana, Nittaw, Riviera, Kaliga, Winder, Malabar, and Pineda soils. Also included are similar soils that have a mucky surface layer 2 to 6 inches thick; soils which have large pockets of white carbonatic material in the subsoil; and soils which have a clayey subsoil. Included soils make up less than 15 percent of any mapped area.

The water table is within a depth of 10 inches for 6 months or more during most years. Flooding occurs frequently during the summer rainy season. Available water capacity is medium in the surface layer, medium to high in the subsoil, and low in the substratum. Permeability is moderate to moderately rapid in the surface layer, slow to very slow in the subsoil, and moderate in the substratum. Natural fertility is moderate, and organic matter content is high.

The native vegetation on this soil is a swamp of bald-cypress, red maple, redbay, sweetbay, sweetgum, tupelo, water hickory, water oak, buttonbush, greenbrier, waxmyrtle, switchcane, smartweed, wild grape, lizard's tail, and a variety of sedges.

This soil in its natural condition is too wet for cultivated crops. With the use of a well designed water control system which quickly removes excess water during the wet season, however, this soil has high potential for vegetables. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

Potential for citrus trees is low. In its natural state this soil is unsuitable for this use. In order to realize full potential, a water control system which lowers the water table to a depth of 4 feet is required. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between rows reduces erosion. Areas susceptible to frequent or prolonged freezing temperatures are not suitable for citrus trees.

Although this soil is unsuitable for improved pasture grasses in its natural state, it has high potential for this use if a simple water control system is installed which quickly removes excess surface water after heavy rains. Several adapted grasses and legumes such as pangolagrass, bahiagrass, and white clover produce high yields when adequately fertilized and limed.

This soil has high potential for pine trees, but a water control system which removes excess surface water is required before trees can be planted. Planting the trees in bedded rows lowers the effective depth of the water table.

This soil has low potential for sewage lagoon areas, septic tank absorption fields, trench sanitary landfills, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. Even this potential cannot be realized, however, until a water control system that lowers the depth of the water table is installed. In addition, in areas used as sewage lagoons and trench sanitary landfills, standing water needs to be controlled. Fill material needs to be added in areas used for dwellings without basements and small commercial buildings. The addition of fill material and mounding are needed in areas used as septic tank absorption fields. Fill material needs to be added and the structural strength of foundations increased in areas used for roads and streets. Fill material needs to be added and the surface stabilized in areas used as playgrounds.

Potential is very low for shallow excavations. To reach even this potential, water control systems are needed to control water standing on the surface and the high water table, and side walls need to be shored.

This soil is in capability subclass IIIw and woodland ordination group 2w.

14—Holopaw fine sand. This is a poorly drained, nearly level soil in low, broad flats and poorly defined drainageways in the flatwoods. Areas range from 4 to 150 acres and are circular to irregularly elongated. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark grayish brown and gray fine sand about 8 inches thick. The fine sand subsurface layer extends to a depth of 47 inches. The upper 11 inches is light gray and has yellowish brown mottles; the next 17 inches is light gray and has dark grayish brown and yellowish brown mottles; and the lower 11 inches is grayish brown and has dark grayish brown mottles. The subsoil extends to a depth of 60 inches. The upper 8 inches is grayish brown sandy clay loam, and the lower 5 inches is dark grayish brown sandy loam that contains streaks and pockets of loamy sand and sandy clay loam. The substratum is gray loamy sand that contains pockets and lenses of sand.

Included with this soil in mapping are small areas of Riviera, Delray, Malabar, and Oldsmar soils. Also included are small areas of this Holopaw soil in depressions in which water stands for more than 6 months in most years. Included soils make up less than 15 percent of any mapped area.

This soil has a water table within a depth of 10 inches for 2 to 6 months in most years. The water table is usually between depths of 10 and 40 inches during the rest of the year. It recedes, however, to a depth of more than 40 inches during very dry times. Available water capacity is very low in the surface and subsurface layers, medium in the subsoil, and low in the substratum. Permeability is rapid in the surface and subsurface layers, moderately rapid in the subsoil, and rapid in the substratum. Natural fertility and organic matter content are low.

Natural vegetation consists of cabbage palms and scattered longleaf and slash pine trees. There are a few water oaks, particularly in higher areas. Sawpalmetto, waxmyrtle, inkberry, and American beautyberry are the main shrubs. Creeping bluestem is the dominant grass in most places, but in some areas, sand cordgrass is dominant. Other common grasses are indiagrass, chalky bluestem, several species of panicums, pineland threeawn, South Florida bluestem, and switchgrass. Many areas are used as range.

This soil has severe limitations for cultivated crops because of wetness and low fertility. Low organic matter content, low natural fertility, and the prolonged high water table limit the capability of this soil for crops. With the use of good water control and intensive management, this soil has medium potential for a number of vegetable crops. A water system control which removes excess water and soil improving practices such as plowing under crop residues are required. Irrigation may be required during extended dry seasons. Seedbed preparation that includes bedding of rows lowers the effective depth of the water table.

Potential for citrus is medium except in areas subject to freezing temperatures. In order to reach this potential, a well designed water control system which lowers the seasonal high water table to a depth of 4 feet is required. Planting the trees on bedded rows lowers the effective depth of the water table, and maintaining plant cover between the rows reduces erosion.

This soil has medium potential for improved pasture grasses. Pangolagrass, improved bahiagrass, and white clover produce good yields when well managed. Water control measures which quickly remove excess surface water are required. Fertilizer and lime are needed, and controlled grazing helps maintain plant vigor.

Potential for pine trees is medium. Equipment limitations during periods of high rainfall, plant competition, and seedling mortality due to either excessive or insufficient moisture are the primary management concerns. Planting the trees on bedded rows lowers the effective depth of the water table.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize this potential, water control measures must be applied to the soil, and fill material needs to be added. In addition, septic tank absorption fields may need to be

mounded in places, and the structural strength of foundations for local roads and streets needs to be increased.

Potential is low for trench sanitary landfills, sewage lagoon areas, and shallow excavations. Water control measures are needed to reach this potential. Sewage lagoon areas also need to be sealed or lined with impervious material, and the side walls of shallow excavations also need to be shored.

This soil is in capability subclass IVw and woodland ordination group 3w.

15—Hontoon muck. This is a very poorly drained, nearly level, organic soil in depressional areas and in fresh water marshes and swamps. Slopes are less than 1 percent.

Typically, the surface layer is dark reddish brown muck about 5 inches thick. The next layer is black muck about 24 inches thick. Below is dark reddish brown muck which extends to a depth of 70 inches or more.

Included with this soil in mapping are similar soils that have, normally at a depth of 30 to 50 inches, a 3- to 5-inch layer of partially decomposed wood fragments as much as 5 inches in diameter. Also included are small areas of Samsula, Kaliga, and Placid soils. Included soils make up about 20 percent of any mapped area.

Under natural conditions, the water table is within a depth of 10 inches of the surface or above the surface except during extended dry periods. Available water capacity is very high. Permeability is rapid throughout. Organic matter content is very high, and natural fertility is moderate to high.

Natural vegetation consists mostly of sawgrass, maidencane, cattails, giant cutgrass, arrowheads, and a variety of sedges. In some places are thick stands of willow, elderberry, and buttonbush, and in other places are mixed stands of cypress, red maple, loblollybay, black tupelo, and sweetgum trees with a ground cover of greenbriers and ferns.

In its natural state, this soil is not suitable for cultivated crops because of excessive wetness. It has high potential for vegetable crops when a well designed and well maintained water control system is used. This water control system removes excess water during times of heavy rainfall in the growing season and keeps the soil saturated at other times to prevent oxidation of the organic material. Fertilization and liming are needed.

With adequate water control, this soil has high potential for improved pasture grasses and clovers. A water control system which quickly removes excess surface water and maintains the water table near the surface to prevent excessive oxidation of the organic soil is needed to reach this potential. Fertilization is needed. Controlled grazing helps maintain maximum yields.

This soil is not suitable for citrus trees or pine trees.

This soil has very low potential for dwellings without basements, small commercial buildings, local roads and streets, playgrounds, and septic tank absorption fields. For these uses, the organic material must be removed, the areas backfilled with suitable soil material, and water

control established. In addition, mounding may be needed in some areas used as septic tank absorption fields.

Potential is low for trench sanitary landfills, sewage lagoon areas, and shallow excavations. Water control measures are needed to realize even this potential. In addition, special equipment is needed for shallow excavations.

This soil is in capability subclass IIIw. It was not assigned to a woodland ordination group.

16—Immokalee fine sand. This a poorly drained, nearly level soil in broad flatwoods areas. Areas range from about 5 to 200 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is 7 inches of very dark gray fine sand. The fine sand subsurface layer is 30 inches thick. The upper 6 inches is light gray, and the lower 24 inches is white and has faint brown mottles. The subsoil, 10 inches thick, is fine sand weakly cemented by organic matter. The upper 4 inches is black and has very dark brown and grayish brown mottles, and the lower 6 inches is dark reddish brown and has reddish yellow and black mottles. The next layer is 18 inches of dark brown fine sand that has reddish yellow and dark brown mottles. Below this is dark grayish brown fine sand which extends to a depth of 80 inches or more. This layer is mottled with black and very dark grayish brown.

Included with this soil in mapping are small areas of Ankona, Basinger, Myakka, Pomello, and Smyrna soils. Also included are small areas of similar soils in which the subsoil is below a depth of 50 inches or in which texture is coarse sand. These similar soils are primarily in the northwestern part of the survey area. Included soils make up no more than 15 percent of any mapped area.

The water table is at a depth of less than 10 inches for 2 months in most years and within a depth of 10 to 40 inches for 8 months or more in most years. It is at a depth of more than 40 inches during dry periods. Permeability is rapid in the surface and subsurface layers, moderate to moderately rapid in the subsoil, and rapid below. Available water capacity is low in the surface layer, very low in the subsurface layer, medium in the subsoil, and very low in the substratum. Natural fertility and organic matter content are low.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses are creeping bluestem, chalky bluestem, lopsided indiangrass, pineland threeawn, switchgrass, and several panicum species.

This soil has severe limitations for cultivated crops because of wetness during the rainy season, droughtiness during the dry season, and low fertility. The number of adapted crops is limited unless intensive management practices are followed. Potential for a number of vegetable crops is medium. A water control system which removes excess water during wet seasons and provides water for subsurface irrigation during dry seasons is needed. Because of low fertility, plowing under crop residues and following other practices which add organic matter to the soil are needed. Fertilizer and lime should be added according to the needs of the crops.

Potential for citrus trees is low. Citrus trees can be grown successfully on this soil only after a carefully designed water control system which lowers the water table to a depth of about 4 feet has been installed. Planting the trees on beds lowers the effective depth of the water table, and maintaining close-growing cover between the rows reduces erosion. Areas subject to frequent and prolonged periods of freezing temperatures are not suitable for citrus.

This soil has medium potential for improved pasture grasses. Pangolagrass, improved bahiagrass, and white clover grow well with good management. Simple water control measures are needed to quickly remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and controlled grazing helps maintain vigorous plants.

Potential for pine trees is low. Slash pines are better suited than other species. The main management concerns are equipment limitations during wet periods, seedling mortality, and plant competition. A simple water control system is needed to remove excess surface water. Planting the trees on bedded rows lowers the effective depth of the water table.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, trench sanitary landfills, and shallow excavations. Adequate water control measures are needed to realize this potential. In addition, mounding may be needed in places for septic tank absorption fields. Sealing or lining with impervious material is also needed for sewage lagoon areas and trench sanitary landfills; surface stabilization, for playgrounds; and shoring of side walls, for shallow excavations.

This soil is in capability subclass IVw and woodland ordination group 4w.

17—Kaliga muck. This is a very poorly drained, nearly level, organic soil in low flats, fresh water marshes, swamps, and depressions. Areas range from about 4 to 750 acres and are circular to irregularly elongated. Slopes are less than 1 percent.

Typically, the surface layer is muck about 26 inches thick. The upper 7 inches is dark brown, and the lower 19 inches is black. The underlying material is mineral and extends to a depth of 80 inches or more. It is 6 inches of black loam, 5 inches of very dark gray loamy fine sand that contains light gray streaks, 16 inches of very dark gray clay, 12 inches of very dark gray sandy clay loam that has dark gray mottles, and 15 inches of grayish brown loamy fine sand that has dark grayish brown and white mottles.

Included with this soil in mapping are small areas of Delray, Hontoon, Nittaw, Placid, and Samsula soils. Also included are small areas of similar soils that contain less clay in the mineral layers. Included soils make up less than 15 percent of any mapped area.

This soil has a water table at or above the surface except during extended dry periods. Available water capaci-

ty is very high in the organic layers and medium to high in the mineral layers. Permeability is moderate to very rapid in the organic layers, moderate in the upper 11 inches of the mineral layers, and slow to very slow in the lower 44 inches. Natural fertility and organic matter content are high.

Natural vegetation consists mostly of sawgrass, maidencane, cattails, giant cutgrass, arrowheads, and a variety of sedges. In some places are thick stands of willow, elderberry, and buttonbush, and in other places are mixed stands of cypress, red maple, loblollybay, black tupelo, and sweetgum trees with a ground cover of greenbriers and ferns.

In its natural state this soil is unsuitable for cultivated crops due to excessive wetness. With the use of a well designed water control system which removes excess water, however, this soil has high potential for a number of vegetables. Saturating the soil with water when crops are not being grown prevents oxidization of the organic matter. Fertilizers and lime need to be applied regularly. Crop residues and cover crops should be plowed under.

Potential for improved pasture grasses is high. Pangolagrass, improved bahiagrass, and white clover grow well on this soil. A water control system is needed to remove excess surface water and maintain the water table near the surface to prevent oxidation of the organic soil materials. Fertilizer needs to be applied regularly, and lime is also needed. Controlled grazing helps prevent overgrazing and weakening of the plants.

This soil is not suitable for citrus trees or pine trees.

This soil has very low potential for dwellings without basements, small commercial buildings, local roads and streets, playgrounds, and septic tank absorption fields, but the organic material needs to be removed and backfilled with suitable soil material and water control needs to be established. Mounding of absorption fields may also be needed in places.

Potential is low for trench sanitary landfills, sewage lagoon areas, and shallow excavations; water control is needed to realize this potential, and special equipment is also needed for shallow excavations.

This soil is in capability subclass IIIw and woodland ordination group 4w.

18—Lokosee fine sand. This is a poorly drained, nearly level soil on low hammocks and in a few flatwoods areas. Many areas border flood plains of streams or are next to lakes and well-defined drainageways. Areas range from about 4 to 500 acres and are circular to elongated. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer is fine sand about 23 inches thick. It is light gray in the upper 3 inches and white in the lower 20 inches. The upper subsoil is fine sand about 8 inches thick. It is very pale brown in the upper 3 inches and yellow in the lower 5 inches. The next layer is dark grayish brown and dark brown fine sand about 8 inches thick. Scattered throughout this layer are weakly cemented fragments of very dark gray fine

sand. Next is about 6 inches of light gray fine sand. Between depths of about 49 and 57 inches or more is a lower subsoil of gray sandy clay loam.

Included with this soil in mapping are small areas of EauGallie, Holopaw, Oldsmar, Pineda, and Riviera soils. Also included are small areas of soils that lack the layer of light gray fine sand above the lower subsoil and small areas of soil in which the surface layer is gray or grayish brown. Included soils make up less than 20 percent of any mapped area.

The water table is within a depth of 10 inches of the surface for 2 to 4 months of the year. It is at a depth of 10 to 40 inches for more than 6 months and recedes to a depth of more than 40 inches during prolonged dry periods. Available water capacity is very low to low to a depth of 49 inches and medium below. Permeability is moderate to moderately rapid in the subsoil and rapid in the other layers. Organic matter content and natural fertility are low.

Natural vegetation consists of cabbage palms and scattered longleaf and slash pine trees. There are a few water oaks, particularly in higher areas. Sawpalmetto, waxmyrtle, inkberry, and American beautyberry are the main shrubs. Creeping bluestem is the dominant grass in most places, but in some areas, sand cordgrass is dominant. Other common grasses are indiangrass, chalky bluestem, several panicum species, pineland threeawn, South Florida bluestem, and switchgrass. Many areas are used as range.

This soil has severe limitations for cultivated crops because of wetness and low fertility. With intensive management and the use of a water control system which removes excess water, potential for vegetables is medium. Irrigation may be required for crops grown during the dry winter season. Crop residue and cover crops should be plowed under to add organic matter to the soil and improve fertility. Fertilizer and lime should be applied as needed. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

This soil is unsuitable in its natural state for citrus trees, but with the use of a water control system which maintains the water table at a depth of about 4 feet, potential is medium. Planting the trees on beds lowers the effective depth of the water table, and maintaining close-growing cover between the rows reduces erosion.

Potential for improved pasture grasses is medium. Simple water control measures are needed to quickly remove excess surface water after periods of heavy rainfall. Fertilizer and lime should be applied as needed. Controlled grazing helps prevent overgrazing and weakening of the plants.

Potential for pine trees is medium. Primary management considerations are equipment limitations, seedling mortality, and plant competition. A simple water control system is needed to remove excess surface water. Planting the trees on beds lowers the effective depth of the water table.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, trench sanitary landfills, and shallow excavations. Adequate water control measures are needed to realize this potential. In addition, mounding may be needed in some places for septic tank absorption fields; sealing or lining with impervious material, for sewage lagoon areas and trench sanitary landfills; and surface stabilization, for playgrounds. The side walls of shallow excavations also need to be shored.

This soil is in capability subclass IVw and woodland ordination group 3w.

19—Malabar fine sand. This is a nearly level, poorly drained soil in broad sloughs in the flatwoods. Areas range from about 5 to 450 acres. Slopes range from 0 to 2 percent.

Typically the surface layer is black fine sand about 4 inches thick. The subsurface layer is fine sand about 14 inches thick. The upper 6 inches is light brownish gray, and the lower 8 inches is very pale brown mottled with yellowish brown. The upper subsoil is fine sand about 20 inches thick. The first 4 inches is light yellowish brown and has distinct yellow mottles; the next 6 inches is reddish yellow and has light brownish gray mottles; and the lower 10 inches is yellowish brown and has strong brown mottles. Next is a 12-inch layer of light brownish gray fine sand that separates the upper and lower subsoil. The lower subsoil extends between depths of 50 and 68 inches. It is olive gray sandy clay loam mottled with light brownish gray. Below is olive gray sandy loam that contains light brownish gray mottles and pockets of dark grayish brown sand and sandy clay loam.

Included with this soil in mapping are small areas of Delray, Pineda, Riviera, Winder, and Pompano soils. Also included are soils that have a strongly acid surface layer and strongly acid loamy layers at a depth of 20 to 40 inches. Included soils make up no more than 15 percent of any mapped area.

The water table is within a depth of 10 inches for 2 to 6 months during most years. Available water capacity is very low or low in the surface layer, subsurface layer, and upper subsoil; medium in the lower subsoil; and low to very low in the substratum. Permeability is rapid in the surface layer, in the subsurface layer, in the upper subsoil, and in the sandy layer between the upper and lower subsoils; slow to very slow in the lower subsoil; and rapid in the substratum. Organic matter content and natural fertility are low.

Natural vegetation consists of cabbage palms and scattered longleaf and slash pine trees. There are a few water oaks, particularly in higher areas. Sawpalmetto, waxmyrtle, inkberry, and American beautyberry are the main shrubs. Creeping bluestem is the dominant grass in most places, but in some areas, sand cordgrass is dominant. Other common grasses are indiangrass, chalky bluestem, several species of panicums, pineland threeawn, South Florida bluestem, and switchgrass. Many areas are used as range.

Limitations for cultivated crops are severe because of wetness and low fertility. With the use of intensive management and a water control system which removes excess water in wet seasons, potential is medium for a number of adapted vegetables. Irrigation may be necessary for best plant growth during dry seasons. Crop residues and soil improving cover crops should be plowed under to add organic matter to the soil and improve fertility. Planting the trees on beds lowers the effective depth of the water table. Fertilizer should be applied according to the needs of the crop.

This soil is unsuitable in its natural state for citrus trees. It has medium potential for this use after a well designed water control system which maintains the water table at a depth of about 4 feet is installed. Planting the trees on bedded rows lowers the effective depth of the water table. Maintaining close-growing cover between the rows reduces erosion. Fertilizer and lime should be applied as needed.

Potential for improved pasture grasses is medium. Pangolagrass, improved bahiagrass, and white clover produce high yields when well managed. A simple water control system which removes excess surface water quickly is needed. Fertilizer and lime need to be applied regularly, and controlled grazing helps prevent weakening of the stand.

Potential for pine trees is medium. The major management concerns are equipment limitations during periods of high rainfall and plant competition. Seedling mortality is usually high because of extremes in soil moisture content. Planting the trees on bedded rows lowers the effective depth of the water table. A simple water control system needs to be installed to remove excess surface water.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even this potential for all these uses, however, water control measures are needed and fill material needs to be added. In addition, mounding may be needed in places for septic tank absorption fields, and structural strength of foundations needs to be increased for local roads and streets.

Potential is also low for trench sanitary landfills, sewage lagoon areas, and shallow excavations. Water control measures are needed to realize this potential. In addition, sewage lagoon areas need to be sealed or lined with impervious material, and the side walls of shallow excavations need to be shored.

This soil is in capability subclass IVw and woodland ordination group 3w.

20—Malabar fine sand, depressional. This is a poorly drained, nearly level soil in depressions in the flatwoods (fig. 4). Most areas are circular or elongated and range from about 4 to 200 acres. Slopes are less than 1 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is fine sand about 18 inches thick. The upper 10 inches is light gray,

and the lower 8 inches is white and has mottles of yellow and brownish yellow. The upper subsoil is fine sand about 29 inches thick. The first 9 inches is yellow and has distinct brownish yellow mottles, the next 10 inches is yellowish brown, and the lower 10 inches is light yellowish brown. Next is a 14-inch thick layer of light brownish gray fine sand that separates the lower and upper subsoil. The lower subsoil, between depths of 65 and 80 inches or more, is dark gray fine sandy loam that contains pockets and lenses of grayish brown fine sand.

Included with this soil in mapping are small areas of Basinger, Gentry, Holopaw, Lokosee, Riviera, Pompano, Placid, and Kaliga soils. Also included is a similar soil that lacks the lower subsoil and that is sandy to a depth of more than 80 inches. Some areas of this soil are in poorly defined drainageways through which water is channeled by artificial drainage. These areas are subject to flooding during periods of high rainfall. Included soils make up less than 20 percent of any mapped area.

Six inches to 2 feet of water stand on the surface for 6 to 12 months during most years. During winter and spring, when very little rain falls, the water table is at a depth of 10 to 20 inches. Available water capacity is very low or low in the surface layer, in the subsurface layer, in the upper subsoil, and in the sandy layer between the upper and lower subsoils, and medium in the lower subsoil. Permeability is rapid in the surface layer, subsurface layer, and upper subsoil, and slow to very slow in the lower subsoil. Organic matter content and natural fertility are low.

Native vegetation often occurs as circular bands on this soil. The small areas of very wet soils generally support sawgrass, maidencane, cutgrass, and pickerelweed. Outward from the center are smaller amounts of maidencane in association with St. Johnswort. Sand cordgrass, low panicum, stiff paspalum, and species of nut rushes are also common.

Under natural conditions this soil is not suitable for cultivated crops or improved pasture grasses. The potential for vegetables or pasture is very low. Water stands on the surface for long periods. Adequate drainage is difficult to establish because in most places suitable outlets are not available. In its native state this soil provides watering places and feeding grounds for many kinds of wading birds and other wetland wildlife.

Potential for pine trees is low. Full potential can be realized only after a good water control system which removes excess surface water is installed. Pond pines are the best trees to plant.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even this potential, however, water control measures are needed and fill material needs to be added (fig. 5). In addition, absorption fields need to be mounded and the surfaces of playgrounds stabilized.

Potential is very low for trench sanitary landfills and sewage lagoon areas. Standing surface water and the

water table need to be controlled and special equipment used. Potential for shallow excavations is also very low. Standing surface water and the water table need to be controlled and side walls shored.

This soil is in capability subclass VIIIw and woodland ordination group 3w.

21—Malabar-Pineda complex. This complex consists of poorly drained, nearly level Malabar and Pineda soils in flatwoods areas so intermingled that they could not be separated at the scale used for mapping. Areas are broad and irregularly shaped. They range from about 4 to 1,000 acres. The Malabar soils are in broad, poorly defined sloughs and on low flats. They are interspersed with slightly higher "islands" of Pineda soils. Individual areas of each soil are about 0.25 acre to 3 acres. Slopes range from 0 to 2 percent.

Malabar fine sand makes up about 50 to 65 percent of each mapped area. Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer is fine sand about 8 inches thick. The upper 5 inches is light brownish gray, and the lower 3 inches is light gray. The upper subsoil is fine sand about 26 inches thick. The first 6 inches is yellowish brown and has distinct dark gray mottles, the next 10 inches is yellowish brown, and the lower 10 inches is yellowish brown and has strong brown mottles. Next is a 12-inch layer of light gray fine sand that separates the upper and lower subsoils. The lower subsoil, between depths of 50 and 80 inches or more, is gray sandy clay loam that has dark yellowish brown and yellowish brown mottles.

Malabar soils have a water table within a depth of 10 inches for 2 to 6 months during most years. Available water capacity is low or very low in the surface and subsurface layers and in the upper subsoil, medium in the lower subsoil, and low or very low in the substratum. Permeability is rapid in the surface and subsurface layers, in the upper subsoil, and in the sandy layer between the upper and lower subsoils; slow to very slow in the lower subsoil; and rapid in the substratum. Organic matter content and natural fertility are low.

Pineda fine sand makes up about 30 to 40 percent of each mapped area. Typically, the surface layer is fine sand about 8 inches thick. The upper 4 inches is black, and the lower 4 inches is very dark gray. The subsurface layer is light gray fine sand about 4 inches thick. The upper subsoil is fine sand about 13 inches thick. It is very pale brown in the first 7 inches and is yellowish brown and has light brownish gray mottles in the lower 6 inches. Next is a 6-inch layer of light gray fine sand that separates the upper and lower subsoil. The lower subsoil, between depths of 31 and 80 inches or more, is 4 inches of gray sandy loam that has yellowish brown mottles and 45 inches of gray sandy clay loam that has light gray and yellowish brown mottles.

Pineda soils have a water table at a depth of less than 10 inches for 1 to 6 months annually. Available water capacity is very low in the surface and subsurface layers, in the upper subsoil, and in the sandy layer between the

upper and lower subsoils, and medium in the lower subsoil. Permeability is rapid in the surface and subsurface layers and in the upper subsoil and slow to very slow in the lower subsoil. Natural fertility and organic matter content are low throughout.

Included with these soils in mapping are small areas of soils that are mostly similar to Malabar or Pineda soils. Included soils make up 5 to 20 percent of this map unit.

Natural vegetation consists of cabbage palms and scattered longleaf and slash pine trees. There are a few water oaks, particularly in higher areas. Sawpalmetto, waxmyrtle, inkberry, and American beautyberry are the main shrubs. Creeping bluestem is the dominant grass in most places, but in some areas, sand cordgrass is dominant. Other common grasses are indiagrass, chalky bluestem, several panicum species, pineland threeawn, South Florida bluestem, and switchgrass. Many areas are used as range.

These soils have medium potential for cultivated crops. Excessive wetness and low fertility are severe limitations. A water control system which removes excess water is needed before vegetables can be grown. Irrigation may be required for best yields when crops are grown during the dry winter months. Crop residues and cover crops need to be plowed under to improve the level of fertility. Fertilizer and lime should be applied according to the needs of the crops. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

Potential for citrus trees is medium except in areas subject to frequent freezing temperatures. A carefully designed water control system which maintains the water table at a depth of about 4 feet is needed before these soils can be used for citrus trees. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the rows reduces erosion. Fertilizer and lime should be applied as needed.

Potential for improved pasture grasses is medium. Simple water control measures are needed to remove excess surface water after heavy rains. Fertilizer and lime should be applied regularly according to the needs of the crop, and controlled grazing helps prevent overgrazing and subsequent weakening of the plants.

Potential for pine trees is medium. The main management concerns are equipment limitations during periods of high rainfall, seedling mortality, and plant competition. Planting the trees on beds and simple water control measures remove excess surface water.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even this potential, however, water control measures are needed and fill material needs to be added. In addition, mounding may be needed in places for septic tank absorption fields, and the structural strength of foundations for local roads and streets needs to be increased.

Potential is also low for trench sanitary landfills, sewage lagoon areas, and shallow excavations. Water control measures are needed to realize this potential. In addition, sewage lagoon areas need to be sealed or lined with impervious material and the side walls of shallow excavations need to be shored.

This soil is in capability subclass IVw and woodland ordination group 3w.

22—Myakka fine sand. This a poorly drained, nearly level soil in broad areas in the flatwoods. Areas range from about 6 to 800 acres. Slopes range from 0 to 2 percent.

Typically, Myakka soils have a surface layer of very dark gray fine sand about 7 inches thick. The subsurface layer is light gray fine sand about 20 inches thick. It has very dark grayish brown and brown streaks along root channels. The subsoil is fine sand that is weakly cemented with organic matter. It is black in the upper 6 inches and dark reddish brown and very dark gray in the lower 4 inches. Next is a 6-inch layer of dark yellowish brown fine sand that has dark reddish brown stains along root channels. The next 27 inches is light yellowish brown fine sand. It is underlain by a layer of weakly cemented, dark reddish brown fine sand that extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Smyrna, Immokalee, Ona, Cassia, EauGallie, and Pomello soils. Included soils make up no more than 20 percent of any mapped area.

The water table is at a depth of less than 10 inches for 1 to 4 months in most years and a depth of more than 40 inches during very dry seasons. Permeability is rapid in the surface and subsurface layers, moderate to moderately rapid in the subsoil, and rapid in the substratum. Available water capacity is very low above the subsoil, medium in the subsoil, and very low below the subsoil. Natural fertility and organic matter content are low.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses are creeping bluestem, chalky bluestem, lopsided indiagrass, pineland threeawn, switchgrass, and several species of panicums.

This soil has severe limitations for cultivated crops because of wetness and low fertility. The number of adapted crops is limited unless very intensive management practices are followed. The soil has medium potential for a number of vegetables. A water control system is needed to remove excess water in the wetter seasons and provide subsurface irrigation in dry seasons. Crop residues and soil-improving crops should be plowed under. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

Potential for citrus trees is low, and then only after a carefully designed water control system has been installed to maintain the water table below a depth of 4 feet. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the rows reduces erosion. Areas subject to freezing temperatures in winter are not suitable for citrus.

Potential for improved pasture grasses is medium. Pangolagrass, improved bahiagrass, and white clover grow well when well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and controlled grazing helps prevent overgrazing and weakening of the plants.

Potential for pine trees is low. Slash pines are better suited than other species. The main management concerns are equipment limitations during periods of heavy rainfall, seedling mortality, and plant competition. Simple water control systems remove excess surface water.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize this potential, however, adequate water control measures are needed. In addition, mounding may be needed in places for septic tank absorption fields; sealing or lining with impervious material is needed for sewage lagoon areas; and surface stabilization is needed for playgrounds.

Potential is also medium for trench sanitary landfills and shallow excavations. Water control measures are needed to realize this potential. In addition, landfills need to be sealed or lined with impervious material and the side walls of shallow excavations need to be shored.

This soil is in capability subclass IVw and woodland ordination group 4w.

23—Myakka-Urban land complex. This complex consists of Myakka fine sand and Urban land in areas so intermingled that they could not be separated at the scale used for mapping. Areas range from about 60 to 2,500 acres. Slopes range from 0 to 2 percent.

About 40 to 60 percent of the complex consists of nearly level, poorly drained Myakka soils. Typically, Myakka soils have a surface layer of black fine sand about 6 inches thick. The subsurface layer is light gray fine sand about 20 inches thick. This layer is mottled with gray, very dark gray, and grayish brown. The subsoil is fine sand that is weakly cemented with organic matter. It is black in the upper 4 inches and dark reddish brown in the lower 6 inches. The fine sand substratum extends to a depth of 80 inches or more. The first 3 inches is dark brown and has very dark brown and black mottles and weakly cemented bodies. The lower part is gray mottled with brown and grayish brown.

Myakka soils have a water table at a depth of less than 10 inches for 1 to 4 months in most years and at a depth of more than 40 inches during very dry seasons. Permeability is rapid in the surface and subsurface layers, moderate to moderately rapid in the subsoil, and rapid in the substratum. Available water capacity is very low in the surface and subsurface layers, medium in the subsoil, and very low in the substratum. Natural fertility and organic matter content are low.

Urban land makes up 20 to 45 percent of this complex. It is mostly covered by dwellings, streets, driveways, buildings, parking lots, and other related construction. It is nearly level.

Unoccupied areas are mostly lawns, parks, vacant lots, and playgrounds consisting of Myakka soils, some of which have been altered by filling and by the sandy materials which have been spread over the surface. This fill has an average thickness of 15 inches but ranges from 8 to 24 inches in thickness. Without the fill, this soil would be like typical Myakka soils. Fill material is normally obtained from excavations made for adjacent streets, but most low areas have been filled in with material transported from more distant places.

Included in mapping are small areas of Smyrna and Immokalee soils. Included soils make up less than about 15 percent of any mapped area.

Present land use precludes the use of this soil for cultivated crops, citrus, or improved pasture. It is, however, well suited to lawn grasses and ornamental shrubs. Some areas from which the surface layer has been removed or on which fill material has been spread may need to have good quality topsoil added.

This complex was not assigned to a capability subclass. The Myakka soil is in woodland ordination group 4w, and Urban land was not assigned to a woodland ordination group.

24—Narcoossee fine sand. This is a moderately well drained, nearly level soil on low ridges and knolls in the flatwoods. Areas range from about 5 to 120 acres. Slopes are convex and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer is fine sand about 17 inches thick. It is gray in the upper 4 inches, and light gray in the lower 13 inches. The subsoil, dark reddish brown and dark brown fine sand which is weakly cemented with organic matter, occurs between depths of 22 and 26 inches. Next is about 10 inches of yellowish brown fine sand mottled with dark yellowish brown and yellowish brown. The substratum is fine sand to a depth of 80 inches or more. The upper 26 inches is light gray and has yellowish brown and brown mottles, and the lower 18 inches is pale brown.

Included with this soil in mapping are small areas of Adamsville, Myakka, Smyrna, and Tavares soils. Also included are small areas of similar soils that have a black, very dark gray, or very dark grayish brown layer at a depth of 70 to 80 inches. Included soils make up less than 15 percent of any mapped area.

This soil has a water table at a depth of 24 to 40 inches for 4 to 6 months in most years. It recedes to a depth of more than 60 inches in extended dry periods. Available water capacity is very low in the surface and subsurface layers, low in the subsoil, and very low in the substratum. Permeability is rapid in the surface and subsurface layers, moderately rapid in the subsoil, and rapid in the substratum. Natural fertility and organic matter content are low.

Native vegetation consists dominantly of large live oak trees (fig. 6) with laurel and water oaks and longleaf and slash pines. Sawpalmetto, sumac, American beautyberry, greenbriers, Virginia creeper, wild grape, and blackberry

are common understory plants. Forbs and grasses are sparse but include partridgeberry, bracken fern, uniolas, pineland threeawn, lopsided indiangrass, and bluestem species.

In its natural state, this soil has severe limitations for cultivated crops because of periodic wetness, droughtiness, and low fertility. The number of adapted crops is very limited unless intensive water control measures are used. Potential for vegetables is low. A water control system that removes excess water in wet seasons and provides subsurface irrigation in dry seasons is needed. Soil improving crops and the residues of all other crops should be plowed under. Fertilizer and lime should be added according to the need of the crop.

Potential for citrus trees on this soil is high if a water control system is installed to remove excess water from the soil rapidly to a depth of about 4 feet. A cover of close-growing vegetation maintained between the trees protects the soil from blowing in dry weather and from erosion during heavy rains. The trees need regular applications of fertilizer, and highest yields require irrigation in seasons of low rainfall. Citrus trees are not suited to areas subject to frequent freezing temperatures.

Potential for improved pasture grasses on this soil is medium. A simple water control system is needed to remove excess surface water in times of heavy rainfall. Regular applications of fertilizers are also needed. Carefully controlled grazing helps maintain healthy plants for highest yields.

This soil has medium potential for longleaf and slash pines. Low fertility keeps this soil from being more productive. Slash pines are better suited than other species.

This soil has high potential for septic tank absorption fields, dwellings without basements, small commercial buildings, and local roads and streets. Adequate water control measures are needed to realize this potential. Potential is also high for playgrounds; the surface, however, needs to be stabilized.

Potential is medium for trench type sanitary landfills and shallow excavations. To realize this potential for trench type sanitary landfills, the trench needs to be sealed or lined with impervious material; for shallow excavations, water control measures are needed and side walls need to be shored.

Potential is low for sewage lagoon areas. To realize even this potential, however, adequate water control measures are needed and the areas need to be sealed or lined with impervious material.

This soil is in capability subclass IIIw and woodland ordination group 3w.

25—Nittaw muck. This is a very poorly drained, nearly level soil in drainageways, swamps, and marshes. Areas range from about 4 to 400 acres. A few areas are small, circular depressions, but most are long, narrow drainageways and flood plains. Slopes are smooth to concave and are less than 1 percent in most places, but they range from 0 to 2 percent.

Typically, the surface layer is dark reddish brown muck about 7 inches thick. The next layer is black fine sand about 8 inches thick. The upper 13 inches of the subsoil is very dark gray sandy clay; the next 24 inches is dark gray sandy clay that has olive gray and olive mottles; and the lower 19 inches is gray sandy clay that contains olive gray mottles and pockets of light gray fine sand. The substratum is light gray fine sand which extends to a depth of 76 inches or more.

Included with this soil in mapping are small areas of Gentry, Floridana, Kaliga, and Winder soils. Also included are similar soils which lack an organic surface layer and soils which have a sandy clay loam subsoil. Included soils make up less than 15 percent of any mapped area.

The water table is at or above the surface for 6 to 8 months in most years. Most areas are flooded during summer. Available water capacity is very high in the organic surface layer, low to medium in the mineral subsurface layer, high in the subsoil, and low in the substratum. Permeability is rapid in the surface and subsurface layers, slow in the subsoil, and rapid in the substratum. Organic matter content is very high to high, and natural fertility is high.

The native vegetation on this soil is a swamp of baldcypress, red maple, redbay, sweetbay, sweetgum, tupelo, water hickory, water oak, buttonbush, greenbrier, waxmyrtle, switchcane, smartweed, wild grape, lizard's tail, and a variety of sedges (fig. 7).

This soil has severe limitations for cultivated crops because of flooding, wetness, and the slowly permeable, clayey subsoil. With the use of a well designed water control system which quickly removes excess water and protects the soil from flooding, this soil has high potential for a number of vegetables. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table. Applications of fertilizer and lime are needed.

This soil is too wet in its natural state for citrus trees, and its potential for this use is low. Because of its location in depressions and drainageways, the adequate water control necessary for citrus culture is difficult to install. The organic surface layer and the clayey subsoil are also severe limitations for citrus trees. This soil is generally in lower areas that are subject to freezing temperatures, which damage citrus.

Potential for improved pasture grasses is high. A water control system which quickly removes excess surface water, however, is required to reach this potential. With good management, Coastal bermudagrass, bahiagrass, and white clover grow well. Fertilization and liming are required. Controlled grazing helps maintain high yields.

Potential for pine trees is high. A simple water control system which quickly removes excess surface water is required. Planting the trees on beds lowers the effective depth of the water table.

This soil has medium potential for sewage lagoon areas. Water control measures are needed to realize this potential.

Potential is low for shallow excavations, trench sanitary landfills, and septic tank absorption fields. To realize even this potential, water control measures are needed, and in areas used as septic tank absorption fields, the organic material needs to be replaced and the area mounded.

Potential is very low for dwellings without basements, small commercial buildings, and local roads and streets. Water control measures, replacement of the organic material, specially designed footings and foundations, and increased structural strength are needed.

This soil is in capability subclass IIIw and woodland ordination group 2w.

26—Oldsmar fine sand. This is a poorly drained, nearly level soil in the flatwoods. Areas range from about 4 to 90 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 6 inches thick. The subsurface layer is fine sand about 37 inches thick. It is gray in the upper 5 inches and light gray in the lower 32 inches. The upper subsoil is 11 inches of weakly cemented, black loamy fine sand. It has very dark gray mottles in the upper 5 inches and dark brown and dark reddish brown mottles in the lower 6 inches. The next 13 inches separates the upper and lower subsoil. The upper 9 inches is dark grayish brown loamy fine sand that contains very dark grayish brown mottles and weakly cemented black fragments. The next 4 inches is light brownish gray fine sand. The lower subsoil is at a depth of 67 inches and extends to a depth of 80 inches or more. The upper 10 inches is dark gray sandy clay loam mottled with very dark gray and dark grayish brown. The lower 3 inches is greenish gray sandy clay loam with dark gray and gray mottles.

Included with this soil in mapping are small areas of Ankona, Eau Gallie, Immokalee, Myakka, and Smyrna soils. Included soils make up no more than 20 percent of any mapped area.

This soil has a water table within a depth of 10 inches for 1 to 3 months and within a depth of 10 to 40 inches for 6 months or more in most years. Available water capacity is very low in the surface and subsurface layers and medium in the subsoil. Permeability is rapid in the surface and subsurface layers, moderate to moderately rapid in the sandy part of the subsoil, and slow to very slow in the loamy part of the subsoil. Natural fertility and organic matter content are low.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses on this soil are creeping bluestem, chalky bluestem, lopsided indiagrass, pineland threeawn, switchgrass, and several species of panicums.

This soil has severe limitations for cultivated crops because of wetness and low fertility. With the use of intensive management practices and a water control system which removes excess water during wet periods, this soil has high potential for a number of vegetables. Irrigation may be necessary for crops grown during the dry season. Because of low natural fertility, regular applications of fertilizer are required. To increase organic matter content

and improve the level of fertility, all crop residues and soil improving crops should be plowed under. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

Potential for citrus trees is low. The soil is poorly suited to citrus because of wetness. In order to grow citrus trees on this soil, a well designed water control system must be installed which lowers the water table to a depth of about 4 feet. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the rows reduces erosion. Fertilizer and lime are needed.

Potential for improved pasture grasses is medium. Pangolagrass, improved bahiagrass, and white clovers grow well when well managed. A simple water control system is needed to remove excess surface water during wet periods. Regular applications of fertilizer and lime are needed, and controlled grazing helps maintain healthy plants.

Potential for pine trees is medium. Slash pines are the best trees to plant. Equipment limitations during the wet season, seedling mortality, and plant competition are the main limitations. Planting the trees on beds lowers the effective depth of the water table, and a simple water control system is needed to remove excess surface water.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, trench sanitary landfills, and shallow excavations. Adequate water control measures are needed to realize this potential. In addition, mounding may be needed in places for septic tank absorption fields; sealing or lining with impervious material, for sewage lagoon areas and trench sanitary landfills; surface stabilization, for playgrounds; and shoring of side walls, for shallow excavations.

This soil is in capability subclass IVw and woodland ordination group 3w.

27—Ona fine sand. This is a poorly drained, nearly level soil in broad, flat areas in the flatwoods between swamps and marshes or in long, narrow bands bordering depressions and drainageways. Areas are about 3 to 150 acres. Slopes are less than 2 percent.

Typically, the surface layer is black fine sand about 6 inches thick. The subsoil is dark reddish brown, weakly cemented fine sand about 9 inches thick. Next is about 3 inches of dark brown fine sand with brown and pale brown mottles. The substratum is fine sand to a depth of 80 inches or more. The upper 9 inches is pale brown and has brown, dark brown, light gray, and brownish yellow mottles; the next 15 inches is gray and has yellowish brown, brownish yellow, gray, and light gray mottles; and the lower 38 inches is grayish brown and has brownish yellow and light gray mottles.

Included with this soil in mapping are small areas of Basinger, EauGallie, Myakka, Placid, and Smyrna soils. In some places, an indurated ironstone layer is at a depth of about 33 inches. Also included are similar soils that have

a loamy sand layer below a depth of 60 inches. In some places, a second weakly cemented subsoil is generally below a depth of 35 inches. Included soils make up no more than 25 percent of any mapped area.

This soil has a water table within a depth of 10 inches for periods of 1 to 2 months and at a depth of 10 to 40 inches for periods of 4 to 6 months during most years. Available water capacity is medium in the surface layer and subsoil and very low to low in the substratum. Permeability is rapid in the surface layer, moderate in the subsoil, and rapid in the substratum. Natural fertility is medium. Organic matter content is moderate to a depth of 15 inches and low below that.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses on this soil are creeping bluestem, chalky bluestem, lopsided indiangrass, pineland threeawn, switchgrass, and several species of panicums.

Because of excessive wetness, this soil has severe limitations for cultivated crops. With the use of a water control system which removes excess water during wet seasons, potential for vegetables is high. Irrigation may be necessary for crops grown during the dry season. Good management should include practices which return crop residues and close growing cover crops to the soil. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table. Applications of fertilizer and lime should be made according to the needs of the crops.

This soil is poorly suited to citrus trees because of wetness. Potential for this use is low. Before citrus trees can be grown, a water control system which lowers the water table to about a depth of 4 feet is needed. Planting the trees on bedded rows lowers the effective depth of the water table, and maintaining plant cover between the rows reduces erosion. Applications of fertilizer and lime are required.

Potential for improved pasture grasses is high. Pangolagrass, improved bahiagrass, and white clover grow well when well managed. A simple water control system which removes excess surface water during periods of heavy rain is required. Regular applications of fertilizer and lime are required. Controlled grazing helps maintain highest yields.

Potential for pine trees is medium. Slash pines are better suited than other species. Equipment mobility during wet weather, seedling mortality due to extremes in soil moisture content, and plant competition are the main management concerns. A water control system which removes excess surface water is needed. Planting the trees on bedded rows lowers the effective depth of the water table.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, trench sanitary landfills, and shallow excavations. Adequate water control measures are needed to realize this potential. In addition, mounding may be

needed in places for septic tank absorption fields; sealing or lining with impervious material is needed for sewage lagoon areas and trench sanitary landfills; surface stabilization is needed for playgrounds; and shoring of side walls is needed for shallow excavations.

This soil is in capability subclass IIIw and woodland ordination group 3w.

28—Paola sand, 0 to 5 percent slopes. This is an excessively drained, nearly level to gently sloping soil on upland ridgetops and side slopes and on low ridges and knolls in the flatwoods. Areas range from about 5 to 45 acres.

Typically, the surface layer is dark gray sand about 3 inches thick. The subsurface layer is light gray and white sand about 13 inches thick. The next layer is about 27 inches thick. It is yellow sand and has tongues of white sand extending down from the layer above it, and it also contains brown, weakly cemented concretions. Below is reddish yellow sand that extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Pomello, Satellite, and St. Lucie soils. Included soils make up about 15 percent of any mapped area.

This soil has a water table below a depth of 72 inches. Available water capacity is very low, and permeability is very rapid throughout. Natural fertility and organic matter content are low.

Native vegetation on this soil is usually a fairly dense stand of sand pine trees with a dense woody understory of myrtle oak, chapman oak, running oak, sand live oak, sawpalmetto, and rosemary. Pricklypear cactus, deermoss, and lichens are common. Native grasses are usually sparse but include pineland threeawn and grassleaf golder.

This soil has very low potential for cultivated crops due to extreme droughtiness and rapid leaching of plant nutrients. It is not suitable for most cultivated crops. Potential for improved grasses is very low even though good management practices are used. Grasses such as pangolagrass and bahiagrass are best adapted. Clovers are not adapted.

This soil has low potential for citrus; yields are low even where irrigation is used.

Potential is very low for commercial production of pine trees. Sand pines are better suited than other species. Seedling mortality and mobility of equipment are the major management concerns for commercial tree production.

This soil has very high potential for septic tank absorption fields, dwellings without basements, small commercial buildings, and local roads and streets. Because of excessive permeability, however, onsite disposal of sewage can create a hazard of pollution of ground water around septic tank absorption fields. No corrective measures are needed for dwellings without basements, small commercial buildings, and local roads and streets.

This soil has high potential for trench sanitary landfills, sewage lagoon areas, and shallow excavations. To realize

maximum potential, trench sanitary landfills and sewage lagoon areas need to be sealed or lined with impervious material, and sewage lagoon areas need to be shaped. The side walls of shallow excavations need to be shored.

Potential for playgrounds is medium. Land shaping and surface stabilization are needed.

This soil is in capability subclass VIs and woodland ordination group 5s.

29—Parkwood loamy fine sand. This is a poorly drained nearly level soil. It occurs in long, narrow and circular hammocks bordering streams, depressions, and sloughs in the flatwoods. Areas range from about 4 to 40 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is loamy fine sand about 7 inches thick. It is very dark grayish brown in the upper 5 inches and very dark gray in the lower 2 inches. The subsoil is about 49 inches thick. The upper 14 inches is gray fine sandy loam and contains white carbonate concretions, the next 14 inches is light brownish gray fine sandy loam that contains light gray carbonate concretions, and the lower 21 inches is light brownish gray loamy fine sand that contains light gray carbonate concretions. The substratum is at a depth of 56 inches. It is light gray loamy fine sand and extends to a depth of 70 inches or more.

Included with this soil in mapping are small areas of Malabar, Pompano, Riviera, Wabasso, and Winder soils. Also included are similar soils that have a sandy clay loam substratum. Soils that have a subsurface layer of weakly cemented shell and carbonate material are also included in some places. Included soils make up no more than 15 percent of any mapped area.

This soil has a seasonal high water table at a depth of less than 10 inches for a period of 2 to 4 months annually. Available water capacity is low in the surface layer, medium in the subsoil, and low in the substratum. Permeability is very rapid in the surface layer, moderately rapid in the subsoil, and rapid in the substratum. Natural fertility is medium, and organic matter content is moderate in the surface layer.

Natural vegetation is mostly a hammock of mixed cabbage palms, live oaks, and water oaks with scattered magnolia and pine trees. Shrubs are mostly sawpalmetto, inkberry, waxmyrtle, and a variety of vines. Creeping bluestem, pineland threeawn, and low panicums are the main grasses.

Most areas have remained in their native vegetation and are used as range and natural shelter for cattle.

This soil has high potential for vegetables, but a water control system is needed to remove excess water during periods of high rainfall. Irrigation may be necessary for crops grown during the dry season. Good management should include returning all crop residues to the soil. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table. Fertilizer should be applied according to the needs of the crop.

In its natural state, this soil is unsuitable for citrus. Potential for citrus is high if a water control system is installed which maintains the water table at a depth of

about 4 feet. Planting the trees on bedded rows lowers the effective depth of the water table, and maintaining plant cover between the rows reduces erosion. Regular applications of fertilizer are needed. Areas subject to freezing temperatures are not suitable for citrus no matter what corrective measures are taken.

Potential for improved pasture grasses is high. Pangolagrass, bahiagrass, and white clover grow well on this soil. A simple water control system is required to quickly remove excess surface water during times of high rainfall. Regular application of fertilizers and controlled grazing help maintain maximum yields.

Potential for pine trees is medium. Equipment mobility during wet weather, seedling mortality, and plant competition are the main management concerns. Planting the trees on beds lowers the effective depth of the water table. Simple water control systems can be installed to remove excess surface water.

Potential is high for shallow excavations. Water control measures are needed to realize maximum potential.

Potential is medium for septic tank absorption fields, sewage lagoon areas, trench sanitary landfills, dwellings without basements, small commercial buildings, and playgrounds. Water control measures are needed to realize this potential. In addition, trench sanitary landfills need to be sealed with impervious material, and mounding may be needed in places for septic tank absorption fields.

This soil is in capability subclass IIIw and woodland ordination group 3w.

30—Pineda fine sand. This is a poorly drained, nearly level soil on broad, low flats and in narrow hammock areas bordering drainageways and depressions. Areas range from about 4 to 650 acres and are irregular to elongated. Slopes are less than 2 percent.

Typically, the surface layer is fine sand about 6 inches thick. It is very dark gray in the upper 3 inches and dark gray in the lower 3 inches. The subsurface layer is fine sand about 14 inches thick. The upper 8 inches is light gray and has grayish brown, light brownish gray, and light yellowish brown mottles, and the lower 6 inches is very pale brown and has brownish yellow and yellowish brown mottles. The subsoil extends between depths of 20 and 60 inches. The upper 8 inches is brownish yellow fine sand that has yellowish brown, strong brown, and reddish yellow mottles; the next 7 inches is light gray sandy clay loam that has light olive brown mottles; and the lower 25 inches is greenish gray sandy clay loam that has olive mottles. Gray sandy loam with dark gray and light olive gray mottles extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Delray, Floridana, Malabar, and Riviera soils. Also included are a few small areas of a similar soil which has a thick, dark colored surface layer; these areas are mostly in the southeastern part of the survey area. Also included are some areas of soils that are subject to frequent flooding or that have water standing on the surface for 1 to 6 months in most years. Included soils make up less than 15 percent of any mapped area.

This soil has a water table within a depth of 10 inches for 1 to 6 months annually. Available water capacity is very low in the surface layer, subsurface layer, and sandy part of the subsoil, and medium in the loamy part of the subsoil. Permeability is rapid in the surface layer, subsurface layer, and sandy part of the subsoil, and slow to very slow in the loamy part of the subsoil. Organic matter content and natural fertility are low.

Natural vegetation consists of cabbage palms with scattered longleaf and slash pine trees. There are a few water oaks, particularly in higher areas. Sawpalmetto, waxmyrtle, inkberry, and American beautyberry are the main shrubs. Creeping bluestem is the dominant grass in most places, but in some areas, sand cordgrass is dominant. Other grasses that usually grow on this soil are indiangrass, chalky bluestem, several panicum species, pineland threeawn, South Florida bluestem, and switchgrass. Many areas are used as range.

This soil has medium potential for cultivated crops. Wetness and low fertility are the main limitations. The number of crops is limited unless very intensive management practices are followed. With good water control measures and soil improving measures, a number of crops can be grown. A water control system is needed to remove excess water in wet seasons and provide for subsurface irrigation in dry seasons. Crop residues and soil improving crops should be plowed under. Seedbed preparation that includes bedding in rows lowers the effective depth of the water table. Fertilizer and lime should be applied according to need of the crop.

Potential for citrus trees on this soil is medium except in areas where the temperature frequently reaches freezing. A carefully designed water control system should maintain the water table below a depth of about 4 feet. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the rows reduces erosion. Fertilizer and lime should be applied as needed.

This soil has medium potential for improved pasture grasses. Pangolagrass, improved bahiagrass, and white clover grow well when well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and controlled grazing helps prevent overgrazing and weakening of the plants.

This soil has medium potential for pine trees. The major management concerns are mobility of equipment during periods of high rainfall, and plant competition. Seedling mortality is usually high. Slash pines are better suited than other species. A simple water control system is needed to remove excess surface water.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even this potential, however, water control measures are needed, and fill material needs to be added. In addition, mounding may be needed in places for septic tank absorption fields, and structural strength of foundations needs to be increased for local roads and streets.

Potential is low for trench sanitary landfills, sewage lagoon areas, and shallow excavations. Water control measures are needed to realize maximum potential. In addition, sewage lagoon areas need to be sealed or lined with impervious material, and the side walls of shallow excavations need to be shored.

This soil is in capability subclass IIIw and woodland ordination group 3w.

31—Pits. Pits consist of excavations from which soil and geologic material have been removed primarily for use in road and levee construction or as foundations. Many of the pits have been abandoned. Included with these pits in mapping are waste materials, mostly mixtures of sand and sandy loam, piled or scattered around the edges of the pits.

Pits, locally called borrow pits, are mostly small, but there are a few large ones. Some of the largest are along St. Johns Water Management District Levee L-73, south of U.S. Highway 192. The material from these pits was used to construct Levee L-73.

Pits have little or no value for farming or for pine trees.

This land was not assigned to a capability subclass or a woodland ordination group.

32—Placid fine sand. This is a very poorly drained, nearly level soil in low, wet depressions and swamps in the flatwoods. Areas are about 3 to 130 acres and are rounded or elongated in most places. Slopes are less than 1 percent.

Typically, the surface layer is fine sand about 24 inches thick. The upper 14 inches is black and contains pockets of light gray, and the lower 10 inches is very dark gray and also contains pockets of light gray. The underlying layer is fine sand to a depth of 80 inches or more. Between depths of 24 and 36 inches, it is light brownish gray and has mottles and stains of dark grayish brown. Between depths of 36 and 80 inches, it is light gray and has mottles of gray and brown in the upper 14 inches.

Included with this soil in mapping are small areas of Basinger, Delray, Gentry, Ona, Pompano, and Samsula soils. Also included are small areas of a soil that has an acid sandy clay loam layer at a depth of 24 to 30 inches. This soil, which adjoins some large lakes, has an 8- to 12-inch layer of muck or peat overlying the black surface layer. In a few areas about 8 inches of peat or muck and about 6 inches of diatomaceous earth overlie the surface layer. Some areas of Placid fine sand include soils that have a brownish layer at a depth of about 40 to 60 inches. Included soils make up no more than 20 percent of any mapped area.

Water stands on the surface for 6 to 9 months or more in most years. Available water capacity is high in the surface layer and low in the underlying layers. Permeability is rapid throughout. Natural fertility is moderate in the surface layer and low in the underlying layers. Organic matter content is moderate.

Native vegetation consists mainly of maidencane, sand cordgrass, pickerelweed, giant cutgrass, waxmyrtle,

sedges, and rushes. Scattered cypress, bay, tupelo, and cabbage palm trees are in many areas.

In its natural state, this soil is unsuitable for cultivated crops because water stands above the surface for long periods of time and drainage outlets are not available in many places. When water outlets are available and water control systems which remove excess water are installed, this soil has medium potential for a number of vegetables. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table. Fertilizer and lime should be applied according to the needs of the crop.

This soil is unsuitable in its natural state for citrus trees. Because of the extreme wetness and difficulty in establishing adequate water control systems, potential for citrus trees is very low.

Potential for improved pasture grasses is medium. Where suitable outlets are available, a simple water control system which quickly removes excess surface water is needed. Pangolagrass, bahiagrass, and white clover grow well when management includes regular application of fertilizer and lime. Controlled grazing helps maintain healthy plants.

This soil is too wet in its natural state for pine trees. If suitable water outlets are available which allow a simple water control system to be installed, potential for pine trees is high. Pond pines are better suited than other species.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even this potential, however, water control measures are needed and fill material needs to be added. In addition, mounding may be needed in places for septic tank absorption fields, and the surfaces of playgrounds need to be stabilized.

Potential is very low for shallow excavations, trench sanitary landfills, and sewage lagoon areas. Water control measures are needed to realize even this potential. In addition, trench sanitary landfills and sewage lagoon areas need to be sealed or lined with impervious material and the side walls of shallow excavations need to be shored.

This soil is in capability subclass IIIw and woodland ordination group 3w.

33—Placid Variant fine sand. This is a somewhat poorly drained, nearly level soil in the flatwoods and hammocks. Areas are long and narrow and border swamps, marshes, drainageways, and some large lakes. They range from about 20 to 80 acres. Slopes are less than 2 percent.

Typically, the surface layer is fine sand about 17 inches thick. The upper 8 inches is black, and the lower 9 inches is very dark gray. The underlying layers are fine sand to a depth of 80 inches or more. The upper 16 inches is gray, the next 12 inches is light brownish gray and has dark brown mottles, and the lower 35 inches is light brownish gray that grades to light gray in the lower few inches.

Included with this soil in mapping are small areas of Adamsville, Basinger, Ona, and Placid soils. Also included

are small areas of a similar soil that has, at a depth of 25 to 60 inches, a dark brown to dark grayish brown layer containing small, weakly cemented fragments. Included soils make up less than 20 percent of any mapped area.

This soil has a water table at a depth of 20 to 40 inches for 6 to 9 months in most years. During prolonged and extremely dry periods, the water table recedes to a depth of 50 to 60 inches. Available water capacity is high in the surface layer and low in the underlying layers. Permeability is rapid throughout. Natural fertility is high. Organic matter content is moderate.

Native vegetation consists dominantly of large live oak trees with laurel and water oaks and longleaf and slash pines. Sawpalmetto, sumac, American beautyberry, greenbriers, Virginia creeper, wild grape, and blackberry are common understory plants. Forbs and grasses are sparse but include partridgeberry, bracken fern, uniolas, pineland threeawn, lopsided indiangrass, and bluestem species.

In its natural state, this soil has severe limitations for cultivated crops because of periodic wetness. The number of adapted crops is limited unless water control measures are used. Potential for vegetables is high if a water control system is installed that will remove excess water in wet seasons. Irrigation may be needed in dry seasons. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table. Fertilizer and lime should be added according to the need of the crop.

The potential for citrus trees on this soil is high if a water control system is installed that will remove excess water from the soil rapidly to a depth of about 4 feet. Planting the trees on beds lowers the effective depth of the water table. The trees require regular applications of fertilizer, and highest yields require irrigation in seasons of low rainfall. Areas that are subject to frequent freezing temperatures are not suitable for citrus.

Potential for improved pasture grasses is high. A simple water control system is needed to remove excess surface water in times of heavy rainfall. Regular use of fertilizers is also needed. Careful controlled grazing helps maintain healthy plants for highest yields.

This soil has high potential for longleaf and slash pines. The main management concerns are equipment mobility, seedling mortality, and plant competition. Planting the trees on beds lowers the effective depth of the water table. Slash pines are better suited than other species.

This soil has high potential for septic tank absorption fields, local roads and streets, dwellings without basements, and small commercial buildings. Water control measures are needed to realize maximum potential. In addition, specially designed footings are needed for dwellings without basements and small commercial buildings.

Potential is also high for playgrounds; surface stabilization is needed.

Potential is medium for shallow excavations, sewage lagoon areas, and trench sanitary landfills. To realize this potential, however, the following corrective measures are

needed: for shallow excavations, the side walls need to be shored; for sewage lagoon areas, the lagoon needs to be sealed with impervious material and the area needs to be shaped; and for trench sanitary landfills, the landfill needs to be sealed with impervious material and water control measures need to be used.

This soil is in capability subclass IIIw and woodland ordination group 2w.

34—Pomello fine sand, 0 to 5 percent slopes. This is a moderately well drained, nearly level to gently sloping soil. It occurs in areas transitional between the high sand ridges and the flatwoods and on slight knolls and low ridges throughout the flatwoods. Areas are round to elongated and range from about 4 to 90 acres.

Typically, the surface layer is gray fine sand about 4 inches thick. The subsurface layer is fine sand about 43 inches thick. The upper 11 inches is gray, and the lower 32 inches is white and has gray and dark gray mottles. The subsoil is fine sand that is weakly cemented with organic matter; it extends between depths of 47 and 58 inches. The upper 5 inches is black, and the lower 6 inches is dark reddish brown and has black, reddish brown, very dark gray, and dark reddish gray mottles. The next layer is brown fine sand about 7 inches thick. It is underlain by grayish brown fine sand that extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Cassia, Immokalee, Myakka, Smyrna, and St. Lucie soils. Also included are small areas of soils that have a second weakly cemented layer at a depth of more than 62 inches. Included soils make up less than 20 percent of any mapped area.

This soil has a water table at a depth of 24 to 40 inches for periods of about 1 to 4 months during normal wet seasons. During dry seasons, the water table is at a depth of about 40 to 60 inches. Permeability is very rapid in the surface and subsurface layers, moderately rapid in the subsoil, and rapid to a depth of 80 inches or more. Available water capacity is very low in the surface and subsurface layers, medium in the subsoil, and very low below. Organic matter content and natural fertility are very low.

Natural vegetation consists of scattered sand pine, longleaf pine, and slash pine. Sand live oaks form dense thickets in many places. A few sawpalmetto grow in most areas. Pineland threeawn is the major grass, and there are also creeping bluestem, lopsided indiangrass, and low panicums. Running oak is common.

This soil has very low potential for cultivated crops due to droughtiness, low fertility, and rapid leaching of plant nutrients. It is not suitable for most commonly grown vegetables.

Potential for citrus trees is low. The low natural fertility and droughtiness cause the soil to be poorly productive. Irrigation and regular application of fertilizer are required to reach full potential.

Potential for improved pasture grasses is low even if good management practices are used. Grasses such as bahiagrass are best adapted; clovers are not adapted.

Yields are reduced by periodic droughts. Regular fertilizing and liming are needed. Greatly restricted grazing permits plants to maintain vigorous growth for highest yields and to provide good ground cover.

Potential is low for commercial production of pine trees. Sand pines are better suited than other species. Seedling mortality, mobility of equipment, and plant competition are the major management concerns in commercial tree production.

This soil has very high potential for dwellings without basements; no special corrective measures are needed.

Potential is high for septic tank absorption fields and local roads and streets. Water control measures are needed to realize maximum potential. Potential is also high for small commercial buildings and shallow excavations. Land shaping is needed for small commercial buildings, and the side walls of shallow excavations need to be shored.

Potential is medium for trench sanitary landfills and high for sewage lagoon areas. To realize this potential, however, water control measures are needed, and the areas need to be sealed or lined with impervious material.

Potential is also medium for playgrounds; land shaping and surface stabilization are needed.

This soil is in capability subclass VIs and woodland ordination group 4s.

35—Pomona fine sand. This is a poorly drained, nearly level soil on broad, low ridges in the flatwoods. Areas range from about 15 to more than 1,400 acres and are irregularly shaped. Slopes range from 0 to 2 percent.

Typically, the surface layer is fine sand about 9 inches thick. It is very dark gray in the upper 5 inches and dark gray in the lower 4 inches. The subsurface layer is fine sand about 15 inches thick. The upper 5 inches is light brownish gray and has grayish brown mottles, and the lower 10 inches is light gray. The upper subsoil is weakly cemented fine sand between depths of 24 and 32 inches. The upper 4 inches is black, and the lower 4 inches is dark reddish brown. Below this to a depth of 69 inches is fine sand that separates the upper and lower subsoil. The upper 7 inches is dark brown; the next 19 inches is brown; and the lower 11 inches is pale brown. The lower subsoil is 9 inches of gray fine sandy loam. The substratum, which extends to a depth of 80 inches or more, is dark grayish brown fine sand.

Included with this soil in mapping are small areas of Ankona, Basinger, EauGallie, Myakka, Oldsmar, and Vero soils. Also included are similar soils in which the texture of the subsoil is loamy fine sand. Included soils make up less than 15 percent of any mapped area.

In most years under natural conditions, the water table is within a depth of 10 inches for 1 to 3 months and within a depth of 10 to 40 inches for 6 months or more. Available water capacity is low or very low in the surface and subsurface layers, medium in the subsoil, and low or very low in the sandy layers beneath the upper subsoil. Permeability is rapid in the surface and subsurface layers, moderate in the subsoil, and rapid in the sandy

layers beneath the upper subsoil. Natural fertility and organic matter content are low.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses on this soil are creeping bluestem, chalky bluestem, lopsided indiagrass, pineland threeawn, switchgrass, and several panicum species.

This soil has severe limitations for cultivated crops because of excessive wetness and low fertility. With the use of high level management and a water control system which removes excess water during seasons of high rainfall, potential for adapted vegetables is medium. Irrigation may be needed when crops are grown during long periods of low rainfall. Crop residues and soil improving crops should be plowed under. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table. Fertilizer and lime should be added according to the requirements of the crops.

Potential for citrus trees on this soil is low. Before citrus can be grown, a water control system which maintains the water table at a depth of about 4 feet is required. Planting the trees on beds lowers the effective depth of the water table, and maintaining close growing plant cover between the rows reduces erosion.

Potential for improved pasture grasses is medium. Pangolagrass, improved bahiagrass, and white clover grow well when well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and controlled grazing helps maintain high yields.

Potential for pine trees is medium. Slash pines are better suited than other species. Equipment mobility during seasons of high rainfall, seedling mortality, and plant competition are the main management concerns. Planting the trees on beds lowers the effective depth of the water table. A simple water control system which removes excess surface water is also needed.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, trench sanitary landfills, and shallow excavations. Water control measures are needed to realize this potential. In addition, mounding may be needed in places for septic tank absorption fields; sealing or lining with impervious material is needed for sewage lagoon areas and trench sanitary landfills; surface stabilization is needed for playgrounds; and shoring of side walls is needed for shallow excavations.

This soil is in capability subclass IVw and woodland ordination group 3w.

36—Pompano fine sand. This is a poorly drained, nearly level soil. This soil occurs in sloughs and along drainageways and depressions in the flatwoods. It also occurs on broad flats in the St. Johns River Basin. Areas are elongated or circular and range from about 4 to 200 acres. Slopes are less than 2 percent.

Typically, the surface layer is 12 inches thick. The upper 5 inches is dark gray fine sand, and the lower 7

inches is grayish brown fine sand. The underlying layer is fine sand about 68 inches thick or more. In sequence from the top of this layer, the upper 13 inches is light gray and has brownish yellow, yellowish brown, and light yellowish brown mottles; the next 9 inches is very pale brown and has light gray, very pale brown, and brownish yellow mottles, and the lower 46 inches is light gray and has dark gray streaks.

Included with this soil in mapping are small areas of Basinger, Holopaw, Malabar, and Riviera soils. Included soils make up no more than 15 percent of any mapped area.

This soil has a water table at a depth of less than 10 inches for periods of 2 to 6 months in most years and within a depth of 30 inches for more than 9 months in most years. Permeability is very rapid throughout. Available water capacity is very low throughout. Natural fertility and organic matter content are low.

Native vegetation consists mostly of grasses with scattered longleaf pines, sawpalmetto, and waxmyrtle. Grasses include maidencane, pineland threeawn, chalky bluestem, Florida threeawn, low panicums, and sand cordgrass.

Under natural conditions, this soil has very severe limitations for cultivated crops because of wetness and low fertility. The number of adapted crops is limited unless very intensive management practices are followed. With good water control measures and soil improving measures, however, this soil has medium potential for a number of vegetable crops. A water control system is needed to remove excess water in wet seasons and provide for subsurface irrigation in dry seasons. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table. Fertilizer and lime should be added according to the need of the crop.

This soil has low potential for citrus trees, but even then only after a carefully designed water control system has been installed that maintains the water table below a depth of about 4 feet. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the trees reduces erosion. Regular applications of fertilizer and lime are needed.

This soil has low potential for improved pasture grasses. Excessive wetness during the wetter seasons and low fertility severely limit plant growth. Pangolagrass, improved bahiagrass, and white clover can be grown when well managed. A water control system is needed to remove excess surface water after heavy rains and provide subsurface irrigation in dry seasons. Regular applications of fertilizer and lime are needed, and controlled grazing helps prevent overgrazing and weakening of the plants.

This soil has low potential for longleaf and slash pines. A water control system which removes excess surface water is necessary if the potential productivity is to be realized. Seedling mortality and equipment limitations are the main management concerns. Slash pines are better suited than other species.

This soil has medium potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, and shallow excavations. Water control measures are needed to realize maximum potential. In addition, mounding is needed for absorption fields; surface stabilization, for playgrounds; and shoring of side walls, for shallow excavations.

Potential is low for sanitary landfills and sewage lagoon areas. To realize even this potential, however, water control measures are needed, and the areas need to be sealed or lined with impervious material.

This soil is in capability subclass IVw and woodland ordination group 4w.

37—Pompano fine sand, depressional. This is a poorly drained, nearly level soil in depressions and drainageways. Most areas are circular or irregularly elongated. They range from about 3 to more than 1,500 acres. Slopes are less than 1 percent.

Typically, the surface layer is fine sand about 11 inches thick. It is black in the upper 5 inches and dark gray in the lower 6 inches. Below this to a depth of 30 inches is light gray fine sand, and to a depth of 80 inches or more is grayish brown fine sand.

Included with this soil in mapping are small areas of Basinger, Malabar, Placid, and Riviera soils. Included soils generally make up less than 10 percent of any mapped area.

This soil is covered with standing water for 6 to 12 months during most years. Permeability is very rapid throughout, and available water capacity is very low. Natural fertility and organic matter content are low.

Native vegetation is dominantly water-tolerant grasses and small woody shrubs, but in some places, native vegetation is swamp. In the open areas, native vegetation occurs as circular bands. The small areas of very wet soils generally support sawgrass, maidencane, cutgrass, and pickerelweed. Outward from the center are smaller amounts of maidencane in association with St. Johnswort. Sand cordgrass, low panicum, stiff paspalum, and species of nut rushes are also common. In the swamps, cypress, blackgum, tupelo gum, redbay, loblollybay, and red maple trees are dominant.

Under natural conditions, this soil is not suitable for cultivated crops or improved pastures. Potential for crops or pasture is very low. An adequate drainage system is difficult to establish because, in most places, suitable outlets are not available. In their native state, these soils provide watering places and feeding grounds for many kinds of wading birds and other wetland wildlife.

This soil has low potential for pine trees. A good water control system that removes surface water is needed if even this potential is to be realized. Pond pines are better suited than other species.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even this potential, however, adequate water con-

tol measures are needed, and fill material needs to be added. In addition, absorption fields need to be mounded and the surfaces of playgrounds stabilized.

Potential is very low for trench sanitary landfills, sewage lagoon areas, and shallow excavations. To realize even very low potential, however, standing surface water and the water table need to be controlled. In addition, special equipment is needed in areas used as landfills and lagoons, and the side walls of shallow excavations need to be shored.

This soil is in capability subclass VIIw and woodland ordination group 4w.

38—Riviera fine sand. This is a poorly drained, nearly level soil on broad, low flats. Areas range from about 4 to 800 acres and are circular to irregularly shaped and long. Slopes are less than 2 percent.

Typically, the surface layer is about 6 inches of black fine sand. The subsurface layer is 18 inches of white fine sand and has grayish brown and strong brown mottles. The subsoil extends between depths of 24 and 49 inches. The upper 14 inches is very dark grayish brown sandy clay loam that has dark brown and strong brown mottles and tongues of white fine sand extending into it from the layer above, and the lower 11 inches is very dark grayish brown and has very dark gray mottles. The next layer is 12 inches of very dark grayish brown sandy loam that has very dark gray mottles. The substratum, which extends to a depth of 80 inches or more, is dark gray loamy sand that contains pockets of sandy loam and sandy clay loam.

Included with this soil in mapping are small areas of Gentry, Holopaw, Malabar, Pineda, Vero, and Winder soils. Included soils make up less than 15 percent of any mapped area.

This soil has a water table within a depth of 10 inches for 2 to 4 months in most years and at a depth of 10 to 30 inches most of the rest of the year. Available water capacity is low in the surface and subsurface layers, medium to high in the subsoil, and low in the substratum. Permeability is rapid in the surface and subsurface layers, slow to very slow in the subsoil, and moderate to moderately rapid in the substratum. Natural fertility and organic matter content are low.

Natural vegetation consists mostly of a dense stand of cabbage palms. In some places, there are scattered pine trees. The understory is relatively open with a sparse ground cover. Shrubs consist mostly of sawpalmetto, American beautyberry, and inkberry. Creeping bluestem, pineland threeawn, and low panicums are the major grasses. In some of the more open areas, maidencane is common.

This soil has medium potential for vegetables. Wetness and low fertility are limiting factors. High level management and use of a water control system which removes excess water are required to produce satisfactory yields of vegetables. Soil improving practices such as returning all crop residues to the soil and plowing under cover crops should be followed. Irrigation may be needed when crops are grown during long periods of low rainfall.

Seedbed preparation that includes bedding of rows lowers the effective depth of the water table. Fertilizer and lime should be applied according to the needs of the crop.

In its natural state this soil is too wet for citrus trees. With the use of a water control system which maintains the water table at a depth of about 4 feet, however, potential for citrus is medium. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the rows reduces erosion. Fertilizer and lime should be applied as needed.

Potential for improved grasses is medium. Pangolagrass, improved bahiagrass, and white clover produce good yields when well managed. A simple water control system which removes excess surface water after heavy rains is needed. Regular application of fertilizer and lime and controlled grazing help maintain good yields.

Potential for pine trees is medium. Equipment mobility during periods of high rainfall, high seedling mortality, and plant competition are the main management concerns. A simple water control system is needed to remove excess surface water.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, trench sanitary landfills, sewage lagoon areas, and shallow excavations. To realize even this potential, however, water control measures are needed. In addition, mounding may be needed in places for septic tank absorption fields, specially designed foundations are needed for local roads and streets, sealing or lining with impervious material is needed for sewage lagoon areas, and the side walls of shallow excavations need to be shored.

This soil is in capability subclass IIIw and woodland ordination group 3w.

39—Riviera fine sand, depressional. This is a poorly drained, nearly level soil in depressions and on the edges of large lakes that have fluctuating water levels. Areas range from about 4 to 1,200 acres and are circular to irregularly elongated. Slopes are less than 1 percent.

Typically, the surface layer is about 5 inches of black fine sand. The subsurface layer is about 18 inches of light gray sand that has dark grayish brown mottles. The subsoil extends between depths of 23 and 60 inches. The upper 26 inches is light grayish brown and has gray and light gray mottles. This layer has tongues of light gray fine sand extending into it from the layer above. The lower 11 inches is gray and has dark gray, light gray, and olive yellow mottles. The substratum, between depths of 60 and 80 inches or more, is light gray sandy loam that has greenish gray mottles.

Included with this soil in mapping are small areas of Floridana, Gentry, Vero, and Winder soils. Included soils make up less than 15 percent of any mapped area.

Water stands on the surface for 6 months or more in most years. The water table commonly recedes to several inches below the surface during extended dry periods. Available water capacity is low in the surface and subsurface layers, medium to high in the subsoil, and low in the

substratum. Permeability is rapid in the surface and sub-surface layers, slow to very slow in the subsoil, and moderate to moderately rapid in the substratum. Natural fertility and organic matter content are low.

The native vegetation on this soil is a swamp of bald-cypress, red maple, redbay, sweetbay, sweetgum, tupelo, water hickory, water oak, buttonbush, greenbrier, wax-myrtle, switchcane, smartweed, wild grape, lizard's tail, and a variety of sedges.

Under natural conditions, this soil is not suitable for cultivated crops or improved pastures. Potential for crops or pasture is very low because in most places suitable drainage outlets are not available. In their natural state, these soils provide watering places and feeding grounds for many kinds of wading birds and other wetland wildlife.

This soil has medium potential for pine trees. A good water control system to remove surface water is needed before trees can be planted. Pond pines are better suited than other species.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even this potential, however, adequate water control measures are needed, and fill material needs to be added. In addition, absorption fields need to be mounded and the surfaces of playgrounds stabilized.

Potential is very low for trench sanitary landfills, sewage lagoons areas, and shallow excavations. To realize even very low potential, however, standing surface water and the water table need to be controlled. In addition, special equipment is needed in areas used as landfills and lagoons, and the side walls of shallow excavations need to be shored.

This soil is in capability subclass VIIw and woodland ordination group 3w.

40—Samsula muck. This is a very poorly drained, nearly level, organic soil in freshwater marshes and swamps. Slopes are 0 to 1 percent.

Typically, the surface layer is muck about 22 inches thick. The upper 8 inches is dark reddish brown, and the lower 14 inches is black. Beneath the muck is 17 inches of black fine sand that contains light gray lenses of fine sand. Below is grayish brown fine sand that is mottled with dark grayish brown and that extends to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Basinger, Hontoon, Placid, and Kaliga soils. Included soils make up about 20 percent of any mapped area.

This soil has a water table at or above the surface except during extended dry periods. Permeability is rapid throughout. Available water capacity is very high in the organic layers and very low below. Natural fertility is moderate to high. Organic matter content is very high.

Natural vegetation consists mostly of sawgrass, maidencane, cattails, giant cutgrass, arrowheads, and a variety of sedges. In some places there are thick stands of willow, elderberry, and buttonbush, and in other places

there are mixed stands of cypress, red maple, loblollybay, black tupelo, and sweetgum trees with a ground cover of greenbriers and ferns.

In its natural state, this soil is not suitable for cultivated crops. With an adequate water control system, however, it has high potential for vegetables and improved pasture grasses. A well designed and well maintained water control system that removes excess water when crops are on the land and keeps the soil saturated at other times is needed. Fertilizers and lime are needed.

When the water is properly controlled, this soil has high potential for improved pasture grasses and clover. A water control system is needed to maintain the water table near the surface to prevent excessive oxidation of the organic material. Fertilizers are needed. Controlled grazing helps maintain maximum yields.

This soil is not suitable for citrus trees or pine trees.

This soil has very low potential for dwellings without basements, small commercial buildings, local roads and streets, playgrounds, and septic tank absorption fields. To realize even very low potential, however, the organic material needs to be removed, the area backfilled with suitable soil material, and water control measures established. In addition, absorption fields need to be mounded.

Potential is also very low for trench sanitary landfills and sewage lagoon areas. Areas, however, need to be sealed or lined with impervious material. In addition, water control measures are needed for trench sanitary landfills and special equipment is needed for sewage lagoon areas.

Potential is low for shallow excavations; water control measures and special equipment are needed.

This soil is in capability subclass IVw. It was not assigned to a woodland ordination group.

41—Satellite sand. This is a somewhat poorly drained, nearly level soil on low ridges and knolls in the flatwoods. Slopes range from 0 to 2 percent. Areas range from about 3 to 160 acres.

Typically, the surface layer is gray sand about 8 inches thick. The underlying layers are sand to a depth of 80 inches or more. In sequence from the top of this layer, the upper 12 inches is white, the next 10 inches is light gray and has brownish gray and gray mottles; the next 18 inches is light brownish gray and has yellowish red stains along root channels; and the lower 32 inches is light gray and has dark grayish brown mottles.

Included with this soil in mapping are small areas of Adamsville, Cassia, Immokalee, Myakka, Pomello, and St. Lucie soils. Also included are soils that are similar to Satellite soils except that the water table is at a depth of slightly more than 40 to 60 inches for more than 6 months annually and recedes to below 60 inches in dry periods. Included soils make up no more than 20 percent of any mapped area.

This soil has a water table at a depth of 10 to 40 inches for periods of 2 to 6 months in most years and below a depth of 40 inches in dry seasons. Available water capaci-

ty is very low throughout. Permeability is very rapid in all layers. Natural fertility is low, and organic matter content is very low.

Natural vegetation consists of scattered sand pine, longleaf pine, and slash pine. Sand live oaks form dense thickets in many places. A few sawpalmetto are in most areas. Pineland threeawn is the major grass, and there are also creeping bluestem, lopsided indiangrass, and low panicums. Running oak is common.

This soil has very low potential for cultivated crops due to droughtiness, low fertility, and rapid leaching of plant nutrients. It is not suitable for most commonly grown vegetables.

Potential for citrus trees is low. Very low natural fertility and droughtiness result in poor soil quality. Irrigation and regular applications of fertilizer are needed to reach full potential.

Potential for improved pasture grasses is low even if good management practices are used. Grasses such as bahiagrass are best adapted; clovers are not adapted. Yields are reduced by periodic droughts. Regular fertilizing and liming are needed. Greatly restricted grazing helps plants maintain vigorous growth for highest yields and good ground cover.

Potential is low for commercial production of pine trees. Sand pines are better suited than other species. Seedling mortality, mobility of equipment, and plant competition are the major management concerns for commercial tree production.

This soil has medium potential for septic tank absorption fields, dwellings without basements, small commercial buildings, and shallow excavations. Water control measures are needed to realize this potential. In addition, the side walls of shallow excavations need to be shored.

Potential for sewage lagoon areas and trench sanitary landfills is low. To realize even this potential, however, water control measures are needed, and areas need to be sealed with impervious material.

This soil is in capability subclass VIs and woodland ordination group 4s.

42—Smyrna fine sand. This is a nearly level, poorly drained soil in broad flat areas in the flatwoods. Areas range from 6 to 1,200 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is 7 inches of fine sand. The upper 4 inches is black, and the lower 3 inches is dark gray. The subsurface layer is 7 inches of light gray fine sand. The upper subsoil is about 6 inches of fine sand that is weakly cemented with organic matter. The upper 3 inches is black, and the lower 3 inches is dark reddish brown and has reddish brown and dark reddish mottles. Next is about 5 inches of brown fine sand that contains black and dark reddish brown, weakly cemented fragments. Next is about 18 inches of light gray fine sand and 13 inches of grayish brown fine sand. At a depth of 56 inches is a lower subsoil of fine sand which extends to a depth of 80 inches or more. The upper 13 inches is dark reddish brown, and the lower 11 inches is dark reddish brown and black.

Included with this soil in mapping are small areas of Basinger, EauGallie, Myakka, Immokalee, and Placid soils. Included soils make up no more than 20 percent of any mapped area.

The water table is at a depth of less than 10 inches for 1 to 4 months and between depths of 10 and 40 inches for more than 6 months in most years. In rainy seasons the water table rises above the surface briefly. Permeability is rapid in the surface and subsurface layers, moderate to moderately rapid in the upper subsoil, rapid in the next layer, and moderate to moderately rapid in the lower subsoil. Available water capacity is very low to low in the surface and subsurface layers, medium in the upper subsoil, very low to low in the next layer, and medium in the lower subsoil. Natural fertility is low, and organic matter content is moderately low or moderate.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses on this soil are creeping bluestem, chalky bluestem, lopsided indiangrass, pineland threeawn, switchgrass, and several panicum species.

This soil has severe limitations if used for cultivated crops because of wetness and low fertility. Low natural fertility and susceptibility to drought require intensive management, including fertilization and irrigation. Potential for several adapted vegetables is medium. To realize this potential, water control measures which quickly remove excess water after heavy rainfall are needed. Good management practices which include regular fertilization and irrigation during the dry season are also needed. Crop residues and soil improving crops should be plowed under. Seedbed preparation that includes bedding of rows lowers the effective depth of the water table.

This soil has low potential for citrus trees. It is too wet in its natural state for this use. In order to reach even low potential, however, installation of a water control system which lowers the seasonal high water table to a depth of at least 48 inches is needed. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the trees reduces erosion.

Potential for improved pasture grasses is medium. Coastal bermudagrass, pangolagrass, improved bahiagrass, and several legumes such as white clover are suitable for planting. Water control measures which quickly remove excess surface water during the wet season are needed. Regular application of fertilizer and lime and controlled grazing help maintain high production.

Potential for pine trees is medium. Slash pines are better suited than other species. Simple water control measures are needed to remove excess surface water. Planting the trees on beds lowers the effective depth of the water table. Equipment limitations due to poor mobility during the wetter seasons and seedling mortality are the main management concerns.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets,

playgrounds, trench sanitary landfills, and shallow excavations. To realize maximum potential, water control measures are needed. In addition, mounding may be needed in places for septic tank absorption fields; sealing or lining with impervious material is needed for sewage lagoon areas and trench sanitary landfills; surface stabilization is needed for playgrounds; and shoring of side walls is needed for shallow excavations.

This soil is in capability subclass IVw and woodland ordination group 3w.

43—St. Lucie fine sand, 0 to 5 percent slopes. This is an excessively drained, nearly level to gently sloping soil on narrow, discontinuous ridges in the sandy uplands and flatwoods. Areas are long and narrow in most places and range from about 4 to 100 acres.

Typically, the surface layer is gray sand about 4 inches thick. The next 9 inches is light gray fine sand. Below this is white fine sand to a depth of 80 inches or more. The lower 37 inches has dark brown stains along old root channels.

Included with this soil in mapping are small areas of Cassia, Immokalee, Myakka, Pomello, and Smyrna soils. A few areas of soils that have a thicker surface layer are included. Also included are small areas of soils that are similar to St. Lucie soils except that they have yellowish brown fine sand at a depth of 70 to 80 inches. Included soil makes up less than 20 percent of any mapped area.

This soil has a seasonal water table at a depth of 72 to 120 inches. Permeability is very rapid throughout, and available water capacity is very low. Natural fertility is very low, and organic matter content is low.

Native vegetation on this soil is usually a fairly dense stand of sand pine trees with a dense woody understory of myrtle oak, Chapman oak, running oak, sand live oak, sawpalmetto, and rosemary. Pricklypear cactus, deermoss, and lichens are common. Native grasses are usually sparse but include pineland threeawn and grassleaf goldaster.

Potential for cultivated crops, citrus, and improved pasture is very low. This soil is droughty and has very low organic matter content and low natural fertility. These limitations make the soil unsuitable for these uses even with high-level management.

Potential for pine trees is very low. Equipment mobility on the deep, loose sand and high seedling mortality are the main management concerns. Sand pines are better suited than other species.

This soil has very high potential for septic tank absorption fields, dwellings without basements, small commercial buildings, and local roads and streets. Because of excessive permeability, however, onsite disposal of sewage can create a hazard of pollution of ground water around septic tank absorption fields. No corrective measures are needed for dwellings without basements, small commercial buildings, and local roads and streets.

This soil has high potential for trench sanitary landfills, sewage lagoon areas, and shallow excavations. To realize maximum potential, trench sanitary landfills and sewage

lagoon areas need to be sealed or lined with impervious material, and the side walls of shallow excavations need to be shored. In addition, areas used as sewage lagoons need to be shaped.

Potential is medium for playgrounds. Land shaping and surface stabilization are needed.

This soil is in capability subclass VIIs and woodland ordination group 5s.

44—Tavares fine sand, 0 to 5 percent slopes. This is a moderately well drained, nearly level to gently sloping soil on low ridges in the flatwoods. Areas range from about 4 to 250 acres and are circular to irregularly elongated.

Typically, the surface layer is dark grayish brown fine sand about 6 inches thick. Below is 12 inches of grayish brown fine sand that has dark gray and pale brown mottles; 11 inches of pale brown fine sand that has splotches of light gray, uncoated sand grains; 19 inches of very pale brown fine sand that has pale brown mottles; and 32 inches of white fine sand that has very pale brown, pale brown, light grayish brown, and reddish yellow mottles.

Included with this soil in mapping are small areas of Adamsville and Candler soils. Also included are small areas of poorly drained soils that have a layer of fine sand weakly cemented with organic matter at a depth of 20 to 40 inches. Small areas of a similar soil which has a layer of pinkish gray to dark gray sand at a depth of 70 to 80 inches are also included. Included soils make up less than 15 percent of any mapped area.

This soil has a water table at a depth of 40 to 60 inches for more than 6 months in most years. The water table recedes to a depth of more than 60 inches during droughty periods. This soil has very low available water capacity to a depth of more than 80 inches. Permeability is very rapid throughout. Natural fertility and organic matter content are low throughout.

Turkey oak and longleaf pine are the major tree species. Dominant native grass species include creeping bluestem, indiangrass, grassleaf goldaster, and pineland threeawn. Other common plants are gopher apple, pricklypear, and a variety of legumes.

This soil has severe limitations for most cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants. The water table, fluctuating between depths of 40 to 60 inches, supplements the very low available water capacity. Management should include crop rotations that include close-growing crops at least two-thirds of the time. Fertilizer and lime should be applied as needed.

Potential for citrus trees is high in places relatively free from freezing temperatures. A good ground cover of close growing vegetation is needed between the trees to reduce erosion. Citrus can normally be grown without irrigation, but irrigation to maintain optimum yields is usually feasible where irrigation water is readily available. Fertilizing and liming are needed.

Potential for pasture grasses is medium. Pangolagrass, Coastal bermudagrass, and bahiagrasses are well adapted.

These grasses produce good yields when fertilized and limed, and controlled grazing helps maintain vigorous plants for maximum yields.

Potential for pine trees is medium. Equipment limitations, seedling mortality, and plant competition are the main management concerns. Slash pines are better suited than other species.

This soil has very high potential for dwellings without basement, small commercial buildings, and local roads and streets. No corrective measures are needed for these uses.

Potential is high for septic tank absorption fields. Water control measures are needed to realize this potential. Potential is also high for playgrounds; the land, however, needs to be shaped and the surface stabilized.

Potential for trench sanitary landfills, shallow excavations, and sewage lagoon areas is medium. To realize maximum potential, water control measures are needed. In addition, the side walls need to be shored for shallow excavations, and the land needs to be shaped and the areas sealed or lined with impervious material for sewage lagoon areas.

This soil is in capability subclass IIIs and woodland ordination group 3s.

45—Vero fine sand. This is a poorly drained, nearly level soil that formed in sandy marine sediments over loamy materials. It is in broad areas in the flatwoods. Areas range from about 7 to 164 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is fine sand about 10 inches thick. The upper 7 inches is black, and the lower 3 inches is dark gray. The subsurface layer is light gray fine sand about 11 inches thick. The subsoil extends to a depth of 62 inches. It is 3 inches of dark brown fine sand, 4 inches of black fine sand, 4 inches of brown fine sandy loam, 16 inches of light brownish gray sandy clay loam, and 14 inches of gray sandy clay loam. The upper part of the substratum, to a depth of 80 inches, is greenish gray fine sandy loam. The lower part, to a depth of 99 inches or more, is greenish gray loamy fine sand.

Included with this soil in mapping are small areas of Eau Gallie, Myakka, Riviera, and Wauchula soils. Also included is a similar soil in which loamy fine sand underlies the sandy part of the subsoil. Included soils make up no more than 20 percent of any mapped area.

The water table is at a depth of less than 10 inches for 1 to 4 months in most years. It is at a depth of 10 to 40 inches for 6 months or more, and in dry seasons it recedes to a depth of more than 40 inches. Available water capacity is very low to low in the surface and subsurface layers, medium in the subsoil, and very low to low in the substratum. Permeability is rapid in the surface and subsurface layers, slow to very slow in the subsoil, and rapid in the substratum. Natural fertility and organic matter content are low.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses on this soil are creeping

bluestem, chalky bluestem, lopsided indiagrass, pineland threeawn, switchgrass, and several panicum species.

This soil has severe limitations for cultivated crops because of wetness and low fertility. Adapted crops are limited unless very intensive management practices are followed. The soil, however, has high potential for a number of vegetables. A water control system is needed to remove water in the wetter seasons and provide subsurface irrigation in the dry seasons. Crop residues and soil improving crops should be plowed under. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

Potential for citrus trees is low, and then only after a carefully designed water control system that maintains the water table below a depth of 4 feet has been installed. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the trees reduces erosion. Areas subject to freezing temperatures are not suitable for citrus.

Potential for improved pasture grasses is medium. Pangolagrass, improved bahiagrasses, and white clovers grow well when well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and controlled grazing helps prevent overgrazing and weakening of the plants.

Potential for pine trees is medium. Slash pines are better suited than other species. The main management concerns are equipment limitations during periods of heavy rainfall, seedling mortality, and plant competition. For best results, a simple water control system which removes excess surface water is needed.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, trench sanitary landfills, and shallow excavations. To realize maximum potential, water control measures are needed. In addition, mounding may be needed in places for septic tank absorption fields; sealing or lining with impervious material is needed for sewage lagoon areas and trench sanitary landfills; surface stabilization is needed for playgrounds; and shoring of side walls is needed for shallow excavations.

This soil is in capability subclass IIIw and woodland ordination group 3w.

46—Wauchula fine sand. This is a poorly drained, nearly level soil in broad areas in the flatwoods. Areas range from about 9 to 115 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 8 inches thick. The subsurface layer is light gray fine sand about 20 inches thick. The upper 3 inches is gray and has dark gray mottles, and the lower 17 inches is light gray and has dark grayish brown mottles. The upper subsoil is 9 inches of weakly cemented loamy fine sand. It is black in the upper 5 inches and dark brown in the lower 4 inches. Next is a 4-inch layer of brown fine sand that separates the upper and lower subsoil. The

lower subsoil is 15 inches of light brownish gray sandy clay loam. Below it and extending to a depth of 82 inches or more is light brownish gray fine sandy loam.

Included with this soil in mapping are small areas of Vero, Eau Gallie, Myakka, Smyrna, and Ona soils. Included soils make up no more than 15 percent of any mapped area.

The water table is at a depth of less than 10 inches for 1 to 4 months in most years. It is at a depth of 10 to 40 inches for about 6 months or more in most years. Permeability is rapid in the surface and subsurface layers and in the layer between the upper and lower subsoils, and moderate to moderately rapid in the subsoil. Available water capacity is low to medium in the surface layer, very low in the subsurface layer, and high in the subsoil. Natural fertility and organic matter content are low.

Native vegetation consists of longleaf and slash pines with an understory of sawpalmetto, inkberry, fetterbush, and running oak. Grasses on this soil are creeping bluestem, chalky bluestem, lopsided indiagrass, pineland threeawn, switchgrass, and several panicum species.

This soil has severe limitations for cultivated crops because of wetness and low fertility. Adapted crops are limited unless very intensive management practices are followed. The soil has medium potential for a number of vegetables. A water control system is needed to remove excess water in the wetter seasons and provide subsurface irrigation in dry seasons. Crop residues and soil improving crops should be plowed under. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

Potential for citrus trees on this soil is low, and then only after a carefully designed water control system that maintains the water table below a depth of 4 feet has been installed. Planting the trees on beds lowers the effective depth of the water table, and maintaining plant cover between the trees reduces erosion. Areas subject to freezing temperatures are not suitable for citrus.

Potential for improved pasture grasses on this soil is medium. Pangolagrass, improved bahiagrass, and white clovers grow well when well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and controlled grazing helps prevent overgrazing and weakening of the plants.

Potential for pine trees is medium. Slash pines are better suited than other species. The main management concerns are equipment limitations during periods of heavy rainfall, seedling mortality, and plant competition. For best results, a simple water control system that removes excess surface water is needed.

This soil has medium potential for septic tank absorption fields, sewage lagoon areas, dwellings without basements, small commercial buildings, local roads and streets, playgrounds, trench sanitary landfills, and shallow excavations. To realize maximum potential, water control measures are needed. In addition, mounding may be needed in places for septic tank absorption fields; sealing or lining

with impervious material is needed for sewage lagoon areas and trench sanitary landfills; surface stabilization is needed for playgrounds; and shoring of side walls is needed for shallow excavations.

This soil is in capability subclass IIIw and woodland ordination group 3w.

47—Winder loamy fine sand. This is a poorly drained, nearly level soil on broad, low flats that border lakes and streams. Areas range from about 4 to 800 acres, and most are irregularly shaped. Slopes range from 0 to 2 percent.

Typically, the surface layer is 3 inches of very dark gray loamy fine sand. The subsurface layer is about 11 inches of light gray fine sand mottled with very dark gray. The subsoil extends between depths of 14 and 34 inches. The upper 6 inches is very dark gray sandy clay loam and has vertical tongues of gray fine sand extending into it from the layer above. The lower 14 inches is dark gray sandy clay loam. The next layer is 18 inches of light gray fine sandy loam that has dark gray mottles. The underlying material, to a depth of 80 inches or more, is light gray loamy fine sand that has faint white mottles.

Included with this soil in mapping are small areas of Gentry, Holopaw, and Riviera soils. Also included are small areas of a similar soil which is very poorly drained and has a mucky surface layer 3 to 10 inches thick. Included soils make up less than 15 percent of any mapped area.

This soil has a water table at a depth of 0 to 10 inches for 2 to 6 months during most years. Some areas are subject to flooding. Available water capacity is low in the surface and subsurface layers and medium in the subsoil. Permeability is rapid in the surface and subsurface layers and slow to very slow in the subsoil. Natural fertility and organic matter content are low.

Natural vegetation consists of cabbage palms with scattered longleaf and slash pine trees. There are a few water oaks, particularly in higher areas. Sawpalmetto, waxmyrtle, inkberry, and American beautyberry are the main shrubs. Creeping bluestem is the dominant grass in most places, but in some areas, sand cordgrass is dominant. Other common grasses are indiagrass, chalky bluestem, several panicum species, pineland threeawn, South Florida bluestem, and switchgrass. Many areas are used as range.

This soil has severe limitations for cultivated crops because of wetness and low fertility. Low organic matter content, low natural fertility, and a water table that is within 10 inches of the surface for long periods of time limit the use of this soil. With good water control and intensive management, this soil has medium potential for a number of vegetables. A water control system which removes excess water and soil improving practices such as plowing under crop residues are needed. Irrigation may be required during the dry season. Seedbed preparation that includes bedding of the rows lowers the effective depth of the water table.

Potential for citrus is medium except in areas subject to freezing temperatures. In order to reach this potential,

a well designed water control system that lowers the seasonal high water table to a depth of 4 feet is required. Planting the trees on bedded rows lowers the effective depth of the water table, and maintaining plant cover between the rows reduces erosion.

This soil has medium potential for improved pasture grasses and legumes. Pangolagrass, improved bahiagrass, and white clover produce good yields when well managed. Water control measures which quickly remove excess surface water are required. Fertilizer and lime are needed, and controlled grazing helps maintain plant vigor.

Potential for pine trees is high. Equipment limitations during periods of high rainfall, plant competition, and seedling mortality are the primary management concerns. Planting the trees on bedded rows lowers the effective depth of the water table.

This soil has low potential for septic tank absorption fields, dwellings without basements, small commercial buildings, local roads and streets, and playgrounds. To realize even this potential, however, water control measures are needed, and fill material needs to be added. In addition, mounding may be needed in places for septic tank absorption fields, and the structural strength of foundations needs to be increased for local roads and streets.

Potential is also low for trench sanitary landfills, sewage lagoon areas, and shallow excavations. Water control measures, however, are needed to realize even low potential. In addition, sewage lagoon areas need to be sealed or lined with impervious material.

This soil is in capability subclass IIIw and woodland ordination group 2w.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, rangeland, and woodland; as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities; and for wildlife habitat. From

the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand, roadfill, and topsoil. Other information indicates wetness or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

JOHN D. GRIFFIN, agronomist, Soil Conservation Service, helped prepare this section.

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the predicted yields of the main crops and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

Acreage in pasture has been steadily increasing as more of the range and woodland are cleared and planted to tame grasses and legumes (fig. 8). Acreage in crops has remained relatively stable, but acreage in citrus has been decreasing at the rate of about 200 acres per year. There are about 19,000 acres of urban and built-up areas; this figure has been growing at the rate of about 500 acres per year.

More than 187,000 acres in the survey area were used for crops and pasture in 1975, according to the Soil Con-

servation Service "Now on the Land" report. The Florida Crop and Livestock Reporting Service reported that about 160,000 acres were used for pasture, and about 17,000 acres were in citrus groves. About 4,000 acres were hayland. Field crops are not extensively grown in the survey area. Those that are grown are primarily corn and sorghum to be cut as silage for dairy cattle. A small quantity of bahiagrass seed is harvested from improved pastures that are lightly grazed.

Special crops grown commercially in the survey area are citrus, watermelons, cabbage, peppers, tobacco and tomato seedlings, and nursery plants. Citrus is the most important special crop.

The soils in Osceola County Area can potentially produce more food. About 80 percent of the land now used as pasture and about 60 percent of the land now used as range and woodland could be used as cropland. In addition to the reserve productive capacity represented by this land, food production could also be increased by extending the latest crop production technology to all cropland in the survey area. This soil survey can greatly facilitate the application of such technology.

Approximately one-fifth of Osceola County Area is planted to tame pasture. Approximately two-thirds of the farm income is derived from livestock, principally beef cattle and dairies. Cow-calf operations are dominant. Hay is frequently harvested for feeding during winter (fig. 9).

The improved pasture in many parts of the survey area has been greatly depleted by continued excessive use. The amount of forage produced may be less than half of the potential production. Productivity of improved pasture can be increased by fertilizing, seeding legumes, and using other management practices that are effective for specific kinds of soil and pasture and hayland plants.

Where climate and topography are about the same, differences in the kind and amount of forage that pasture can produce are related closely to the kind of soil. Effective management is based on the relationships among soils, pasture plants, fertilization, and water.

Soil erosion is not a major concern in Osceola County Area. Most of the soils have slopes of less than 2 percent, have sandy texture with rapid permeability, and usually have a good cover of vegetation. Some of the better drained soils, such as the Candler, St. Lucie, and Tavares soils which have slopes of 2 to 12 percent, are subject to slight erosion. Most soils, and especially the better drained ones, are subject to soil blowing when vegetative cover is absent. Soil blowing can damage these soils and young, tender crops in a few hours if winds are strong and the soils are dry and bare of vegetation or surface mulch. Maintaining vegetative cover and surface mulch minimizes soil blowing. Windbreaks of adapted trees and strip crops are effective in reducing wind erosion.

Information for the design of erosion control practices for each kind of soil is available in local offices of the Soil Conservation Service.

Water control is a major management need on about 75 percent of the soils in Osceola County Area. Some soils,

such as the very poorly drained Delray, Floridana, and Hontoon soils, are naturally so wet that the production of crops and pasture grasses is generally not possible in their natural state. Crops grown on somewhat poorly drained soils, such as Adamsville soils, are damaged by the high water table in many years. Moderately well drained soils, such as Tavares soils, generally do not have a water table high enough to damage crops in most years.

The design of surface and subsurface water control systems varies with the kind of soil. A combined surface and subsurface system is needed in most areas of the poorly drained and very poorly drained soils used for intensive rowcropping. Drains need to be more closely spaced in soils with slowly permeable layers than in more permeable soils. Finding adequate outlets for water control systems is difficult in many areas.

Organic soils oxidize and subside when the water table is lowered. In areas of organic soils, a water control system is needed to keep the water at the level required by crops during the growing season and to raise it to the surface during other parts of the year to minimize oxidation or subsidence.

Soil tilth is an important factor in the germination of seeds and in the infiltration rate of water into the soil. Soils that have good tilth are granular and porous. Most of the soils used for crops and pasture in Osceola County Area have sandy surface texture and are low in content of organic matter. Regular additions of crop residues, manure, and other organic material can help improve soil structure and increase the available water capacity of these soils.

Soil fertility is also a major consideration in managing the soils in the survey area. Natural fertility is low in most of the soils, and application of lime and complete fertilizer is required for adequate yields of crops and pasture grasses. Minor trace elements should also be included in fertilizers for citrus. Lime and fertilizer applications should be based on soil tests and crop needs. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Pasture yields were estimated for the most productive varieties of

grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to horticultural crops or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. Only the levels class and subclass are used in this soil survey. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is indicated in table 6. All soils in the survey area except Pits, Urban land, and other miscellaneous areas are included. Some of the soils that are well suited to crops and pasture may be in low-intensity use, for example, soils in capability class III. Data in this table can be used to determine the farming potential of such soils.

The capability subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Range and grazeable woodland

CLIFFORD W. CARTER, range conservationist, Soil Conservation Service, helped prepare this section.

Native grasses are an important part of the overall, year-round supply of forage to livestock producers in Osceola County Area. This forage is readily available, it is economical, and it provides important roughage needed by cattle. About 445,400 acres throughout the survey area are used as native range by domestic livestock. Of this, about 98,400 acres are used strictly as range, and the remaining 347,000 acres are grazeable woodland.

The dominant native forage species that grow on a soil are generally the most productive and the most suitable for livestock. They will maintain themselves as long as the environment does not change. The forage species are

grouped into three categories according to their response to grazing—decreasers, increasers, and invaders.

Decreasers generally are the most palatable plants, and they decrease in abundance if the range is under continuous heavy grazing. Increasers are less palatable to livestock; they increase for a while under continuous heavy grazing but eventually decrease under continuous heavy grazing. Invaders are native to the range in small amounts. They have little value for forage, so they tend to increase after other vegetation has been grazed.

Range condition is a measure of the current productivity of the range in relation to its potential. Four condition classes are used to measure range condition. They are:

Excellent condition—Producing 76 to 100 percent of potential.

Good condition—Producing 51 to 75 percent of potential.

Fair condition—Producing 26 to 50 percent of potential.

Poor condition—Producing 0 to 25 percent of potential.

Only about 10 percent of the range in Osceola County Area is in excellent condition, while about 70 percent is in fair and poor condition.

Table 7 shows for each soil the potential for producing livestock forage. Potential production refers to the amount of herbage that can be expected to grow on well managed range. Yields are expressed in table 7 in terms of pounds of air-dry herbage per acre for range in excellent condition in favorable, normal, and unfavorable years. Favorable years are those in which climatic factors such as rainfall and temperature are favorable for plant growth. Moisture content in the plants varies as the growing season progresses and is not a measure of productivity. Forage refers to total vegetation produced and does not reflect forage value or grazing potentials.

The productivity of the soils is closely related to the natural drainage of the soil. The wettest soils, such as those in marshes, produce the greatest amount of vegetation, while the deep, droughty sandhills normally produce the least herbage annually.

Management of the soils for range should be planned with potential productivity in mind. Soils with the highest production potential should be given highest priority if economic considerations are important. Major management considerations revolve around livestock grazing. The length of time an area should be grazed, the season it should be used, how long and when the range should be rested, the grazing pattern of livestock within a pasture that contains more than one soil, and the palatability of the dominant plants on the soil are basic considerations if the range is to be improved or maintained. Manipulation of range often involves mechanical brush control, controlled burning, and especially controlled livestock grazing. Predicting the effects of these practices is of utmost importance. Without exception, the proper management of range will result in maximum sustained production, conservation of the soil and water resources, and generally, improvement of the habitat for many wildlife species.

Grazeable woodland is forest that has an understory of native grasses, legumes, and forbs (fig. 10). The understory is an integral part of the forest plant community. The native plants can be grazed without significantly impairing other forest values. On such forest land, grazing is compatible with timber management if it is controlled or managed in such a manner that timber and forage resources are maintained or enhanced.

Understory vegetation consists of grasses, forbs, shrubs, and other plants within the reach of livestock or of grazing or browsing wildlife. A well managed wooded area can produce enough understory vegetation to support optimum numbers of livestock or wildlife, or both.

Forage production of grazeable woodland varies according to different kinds of grazeable woodland; amount of shade cast by the canopy; accumulation of fallen needles; the influence of time and intensity of grazing on the presence or absence of grass species and forage production; and the number, size and spacing, and method of site preparation for tree plantings.

Woodland management and productivity

LOUIS P. HEARD, environmental coordinator, Soil Conservation Service, helped prepare this section.

According to latest estimates, there are about 360,400 acres of commercial forest and 5,400 acres of noncommercial forest in the survey area. This is about 55 percent of the total area of the survey area. About 347,000 acres of the total forest area is not managed for the purpose of harvesting marketable trees but is used primarily for grazing cattle. Very light stocking or tree density and the resulting open canopy allow valuable native range grasses to thrive. Almost all trees that are harvested have been propagated naturally from seed trees. There are less than 500 acres of planted pine in the survey area. Most of the existing trees are naturally seeded second, third, and fourth generation trees. There are only about 40 acres of original old growth pines remaining.

During the late 1800's and early 1900's, the timber and naval stores industry flourished in Osceola County Area. Several large sawmills and turpentine stills were established during this period, including the first electric sawmill, in Holopaw. The mills sawed primarily longleaf pine, slash pine, and baldcypress. The flourishing timber and naval stores industry ended when the supply of trees was depleted in the early 1900's. The sawmills and turpentine mills were dismantled and were never again established to such a degree. In support of this forest industry, several railroads were built throughout the survey area. Evidence of these "tram lines" still exists today. Many miles of the old railroad grades are still evident.

There are presently three commercial sawmills in the survey area. These mills are sawing mainly pond cypress, which is used primarily in the manufacture of orange boxes and plaster lath. There is one large pulp wood yard, in Kissimmee. This wood yard processes and ships approximately 30,000 cords of pulpwood annually. About 10

percent of the cordage is cut in adjoining Orange and Brevard Counties, and most of this pulpwood is shipped to mills in northern Florida.

Most woodland is burned on an average of once every 2 or 3 years. Burning helps destroy unwanted vegetation and stimulates growth of forage grasses which cattle can graze. This frequent burning, however, has a detrimental effect on tree growth. It is estimated that potential wood productivity is lowered about 20 to 30 percent by excessive burning.

Table 8 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: *x*, *w*, *t*, *d*, *c*, *s*, *f*, and *r*.

In table 8 the soils are also rated for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A

rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade or grow if openings are made in the tree canopy. The invading plants compete with native plants or planted seedlings by impeding or preventing their growth. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* means that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Common trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Windbreaks and environmental plantings

Windbreaks are established to protect livestock, buildings, and yards from wind. Windbreaks also help protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broad-leaved and coniferous species provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field, the interval depending on erodibility of the soil. They protect cropland and crops from wind and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. A healthy planting stock of suitable species planted properly on a well prepared site and maintained in good condition can insure a high degree of plant survival.

Additional information about planning windbreaks and screens and the planting and care of trees can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from nurserymen.

Engineering

JAMES W. NORRIS, area engineer, Soil Conservation Service, helped prepare this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit

from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas

of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 9 shows, for each kind of soil, the degree and kind of limitations for building site development; table 10, for sanitary facilities; and table 12, for water management. Table 11 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 9. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and small commercial buildings referred to in table 9 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not

occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Slope is also an important consideration in the choice of sites for these structures and was considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 9 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, and shrink-swell potential are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, and depth to very compact layers affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 10 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are

those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, and susceptibility to flooding. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoon areas are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material (fig 2). Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 10 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 11 by ratings of good, fair, poor, or unsuited. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 15 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 11 provide guidance as to where to look for probable sources of sand and are based on the probability that soils in a given area contain sizable quantities of sand. None of the soils in the survey area is a suitable source of gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Fine-grained soils are not suitable sources of sand.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 15.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, and slope. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 12 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water management systems.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Organic matter in a soil downgrades the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer (fig. 11). Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to hardpan or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Recreation

JOHN F. VANCE JR., biologist, Soil Conservation Service, helped prepare this section.

Recreation is important to the economy of Osceola County Area. In past years tourism has been the second largest industry in the survey area. Although many tourists come to Osceola County Area primarily for food and lodging while visiting the many popular amusement

attractions nearby, many also come to enjoy the great fishing, hunting, and climate. Approximately 10 to 15 percent of the survey area is now devoted to recreation. Two large state-owned wildlife management areas are open to public for hunting, and many other areas have high potential for recreational development.

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 13 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 10, and interpretations for dwellings without basements and for local roads and streets, given in table 9.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry. Strong slopes can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The

surface is firm after rains and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Wildlife habitat

C.R. MCCracken, biologist, Florida Game and Fresh Water Fish Commission, and JOHN F. VANCE, JR., biologist, Soil Conservation Service, helped prepare this section.

The value and importance of wildlife in Osceola County Area has increased considerably during the past few years with the opening of two large State Wildlife Management areas. Bull Creek Wildlife Management Area, in the east-central part of the survey area, encompasses an area of about 20,000 acres. Three Lakes Wildlife Management Area, in the southwest-central part of the survey area adjoining Lakes Kissimmee, Marian, and Jackson, has a total area of about 52,000 acres. Fish are also significant in the more than 800 lakes in the county. Fish camps located on the larger lakes provide a full range of fishing supplies and services, including the services of professional fishing guides.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 14, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of

fair means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples are sorghum, oats, rye, millets, and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples are bahiagrass, pangolagrass, lovegrass, switchgrass, hairy indigo, sweet clover, and white dutch clover.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples are bluestems, lopsided indiagrass, goldenrod, beggarweed, pokeweed, partridgepea, and low panicums.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, sweetgum, red maple, dogwood, persimmon, sumac, hickory, blackberry, grape, smilax, Virginia creeper, viburnum, huckleberry, cabbage palm, gallberry, sawpalmetto, waxmyrtle, and briers. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated good are American beautyberry, Surinam cherry, podacarpus, youpon, crabapple, and viburnums.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous

plants are depth of the root zone, available water capacity, and wetness. Examples are pine, cedar, and cypress.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples are smartweed, pickerelweed, iris, duck potato, rushes, sedges, cordgrass, and cattail.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are wetness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, killdeer, cottontail rabbit, gray fox, and wild hog.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Examples of wildlife attracted to these areas are wild turkey, thrushes, vireos, woodpeckers, tree squirrels, gray fox, raccoon, and deer.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. Examples of wildlife attracted to this habitat are ducks, herons, egrets, rails, kingfishers, otters, and alligators.

Wildlife management practices

Wildlife habitat management thrives on disturbances such as controlled burning, grazing, chopping, cultivation, water level manipulation, mowing, and sometimes the use of pesticides. Each species of wildlife occupies a niche in a vegetative type; therefore, management for a particular species involves an attempt to keep the vegetative community in the stage or stages that favor that species.

A primary factor in evaluating wildlife habitat is the plant diversity in an area. A wide range in vegetative types or age classes is generally more favorable to wildlife. Increasing dominance by a few plant species is generally accompanied by a corresponding decrease in numbers of wildlife.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data

are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering properties

Table 15 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 15 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 15 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (2) and the system adopted by the American

Association of State Highway and Transportation Officials (AASHTO) (1).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 21. The estimated classification, without group index numbers, is given in table 15. Also in table 15 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the *Unified* and *AASHTO* soil classification systems. They are also used as indicators in making general predictions of soil behavior. Ranges in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterburg limits extend a marginal amount across clas-

sification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 16 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Salinity is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of the nonirrigated soils. The salinity of individual irrigated fields is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of individual fields can differ greatly from the value given in table 16. Salinity affects the suitability of a soil for crop production, its stability when used as a construction material, and its potential to corrode metal and concrete.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also in-

fluence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Wind erodibility groups are made up of soils that have similar properties that affect their resistance to soil blowing if cultivated. The groups are used to predict the susceptibility of soil to blowing and the amount of soil lost as a result of blowing. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are extremely erodible, so vegetation is difficult to establish. They are generally not suitable for crops.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible, but crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible, but crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible, but crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible, but crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible, but crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible, and crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible, and crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to soil blowing.

Soil blowing usually starts at some critical location, building sites for example, where the surface is exposed; in areas of spoil material from excavations; on exposed knolls; on tracks or paths made by machinery or animals; and at corners or turnrows in cultivated areas, where the soil has been excessively pulverized. Soil blowing occurs when a wind of adequate velocity blows across an unprotected surface that is smooth, bare, loose, dry, and finely granulated.

Soil and water features

Table 17 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains is not considered flooding, nor is water in depressions, swamps, and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most like-

ly. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Subsidence is the settlement of organic soils or of soils containing semifluid layers. Initial subsidence generally results from drainage. Total subsidence is initial subsidence plus the slow sinking that occurs over a period of several years as a result of the oxidation or compression of organic material.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The

rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Physical, chemical, and mineralogical analyses of selected soils

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Physical, chemical, and mineral properties of representative pedons sampled in Osceola County Area are presented in tables 18, 19, and 20. Analyses were conducted and coordinated by the Soil Characterization Laboratory at the University of Florida. Detailed profile descriptions of soils analyzed are given in alphabetical order in the section "Soil series and morphology." Laboratory data and profile information for additional soils in Osceola County Area as well as for soils in other counties in Florida are on file at the Soil Science Department, University of Florida.

Soils were sampled from pits at carefully selected locations that represented typifying pedons. Samples were air-dried, crushed, and sieved through a 2-millimeter screen. Most of the analytical methods used are outlined in Soil Survey Investigations Report No. 1 (7).

Particle size distribution was determined by using a modification of the Bouyoucos hydrometer procedure with sodium hexametaphosphate as the dispersant. Hydraulic conductivity, bulk density, and water content were determined on undisturbed core samples. Organic carbon was determined by a modification of the Walkley-Black wet combustion method. Extractable bases were obtained by leaching soils with ammonium acetate buffered at pH 7.0. Sodium and potassium in the extract were determined by flame photometry and calcium and magnesium, by atomic absorption spectroscopy. Extractable acidity was determined by the barium chloride-triethanolamine method at pH 8.2. Cation exchange capacity was calculated by summation of extractable bases and extractable acidity. Base saturation is the ratio of extractable bases to cation exchange capacity expressed in percent. The pH measurements were made with a glass electrode using a soil water ratio of 1:1; a 0.1M calcium chloride solution in a 1:2 soil-solution ratio; and a nitrogen-potassium chloride solution in a 1:1 soil-solution ratio.

Aluminum, carbon, and iron were extracted from suspected spodic horizons with 0.1M sodium pyrophosphate. Determination of aluminum and iron was by atomic absorption spectroscopy and of extracted carbon, by the Walkley-Black wet combustion method.

Mineralogy of the less than 2-micron clay fraction was ascertained by X-ray diffraction. Peak heights were taken at 18-angstrom, 14-angstrom, 7.2-angstrom, 4.83-angstrom, and 4.31-angstrom positions. These positions represent montmorillonite or interstratified expandibles, vermiculite or 14-angstrom intergrades, kaolinite, gibbsite, and quartz, respectively. They were measured, summed, and normalized to give percentage of soil minerals identified in the X-ray diffractograms. This is not an absolute quantity but a relative distribution of clay minerals in the clay fraction. The absolute percentage would require additional knowledge of particle size, crystallinity, unit structure substitution, and matrix problems.

Sands are by far the major fraction in all horizons of all pedons (table 18) with the exception of the IIC3 horizon of the Kaliga series. Pedons of Candler, Paola, Satellite, and St. Lucie soils contain less than 2 percent clay throughout their profiles to a depth of 2 meters. With the exception of a few horizons, the silt content of these soils is also less than 2 percent. Adamsville, Cassia, Myakka, Placid, and Smyrna soils are also inherently sandy and have no more than about 8 percent silt content or 8 percent clay content throughout their profiles. Other pedons, such as Ankona, Gentry, Lokosee, Oldsmar, Vero, and Wauchula, have textural increases of clay in lower horizons, but silt content usually remains very low. With the exception of the Candler and Satellite pedons, the sand fraction of these soils is dominated by fine sand. Droughtiness is a common characteristic of sandy soils, particularly those that are naturally moderately well drained, well drained, or excessively drained.

Based on bulk densities and the moisture retained between 1/10 and 15 bars tension, the Candler, Paola, Satellite, and St. Lucie soils retain only 2 or 3 centimeters of plant-available water in the upper 1 meter of soil. Other mineral soils retain up to or more than 35 centimeters, and Hontoon, an organic soil, retains more than 60 centimeters of plant-available water in the upper meter. Hydraulic conductivity of these soils is usually high, frequently higher than 25 centimeters per hour. However, in the argillic horizons of Ankona, Gentry, Oldsmar, and Vero soils; the Bir horizons of Lokosee soils; and the spodic horizons of Cassia, Oldsmar, and Wauchula soils, the hydraulic conductivity approaches or may be zero.

Low values for extractable bases, cation exchange capacities (sum of cations), and base saturations (table 19) are indicative of low inherent soil fertility. Calcium and magnesium are the predominant bases; the largest amounts of these elements occur in the Hontoon soils. Sodium is almost uniformly low, and trace amounts of potassium further support the absence of appreciable quantities of weatherable minerals (not reported) in the soils. Cation exchange capacity is frequently less than 10 milliequivalents per 100 grams of soil with the exception of surface, sapric, spodic, and a few argillic horizons. Enhanced cation exchange capacity is expected in surface, sapric, and spodic horizons due to the increased reactivity of associated organic material. Higher cation exchange

capacity values in the argillic horizons of Gentry, Oldsmar, and Vero soils are caused by the presence of the much more highly reactive montmorillonitic clays. Soils with low cation exchange capacities require only small amounts of bases to significantly alter both their base status and soil reaction in the upper horizons. Successful crop production on these soils usually requires light but frequent applications of fertilizers. Fertile soils have high cation exchange capacity and high base saturation.

Expectantly, organic carbon content is highest in Histosols and decreases with depth in all mineral pedons except those with Bh horizons. Organic carbon content in the better developed Bh horizons ranges from less than 1.5 percent in the Oldsmar soils to more than 4 percent in the Wauchula soils. Organic carbon is directly responsible for improving nutrient and water retention capacities and is the primary source of cation exchange capacity in the surface horizons of the soils in Osceola County Area. Lack of significant quantities of clay in the upper horizons dictates that the proper use of these soils includes programs for the conservation and maintenance of organic carbon.

Soil reaction in calcium chloride is uniformly low in most pedons, seldom ranging more than 1.5 pH units between horizons within the same profile. The Vero soil is an outstanding exception; pH ranges from 3.2 in the A12 horizon to 7.9 in the C2g horizon. Ankona, Cassia, Hontoon, Myakka, Oldsmar, Paola, Samsula, Satellite, St. Lucie, and Wauchula soils are consistently strongly acid and show little difference in pH between horizons of the same pedon. Correlation between percent base saturation and pH is not always evident as is readily demonstrated by the sandy Candler, Paola, Satellite, and St. Lucie soils.

Sodium pyrophosphate extractable iron was less than 0.1 percent in selected horizons of Spodosols. The ratio of sodium pyrophosphate extractable carbon and aluminum to clay in Ankona, Cassia, Myakka, Smyrna, Vero, and Wauchula soils was sufficient to meet certain chemical criteria for spodic horizons. Oldsmar soils and Lokosee soils, an Alfisol, did not meet these criteria.

Mineralogy of the sand fraction (more than 2 microns) is siliceous; quartz is dominant in all pedons. Very small amounts of heavy minerals, mostly ilmenite, occur in most horizons; the greatest concentration is in the very fine sand fraction. Mineralogy of the crystalline components of the clay fraction (less than 2 microns) is reported in table 20 for specific horizons of selected pedons. In general the clay mineralogical suite is composed of montmorillonite, a 14-angstrom intergrade mineral, kaolinite, and quartz. Gibbsite occurred in detectable amounts only in the Candler soil, which contains less than 2 percent clay. Montmorillonite occurred in Gentry, Kaliga, Oldsmar, Placid, Samsula, and Vero pedons; it dominated the clay fractions only in the lower horizons of Gentry, Kaliga, Oldsmar, and Vero soils. Kaolinite, 14-angstrom intergrade minerals, and quartz occurred in all pedons.

Montmorillonite, least stable of the mineral components in the present environment, appears to have been in-

herited in the Gentry, Kaliga, Oldsmar, Samsula, and Vero soils. This is evidenced by relatively large increases with increased profile depth. The general tendency is for kaolinite to also increase with increasing depth, particularly in pedons with argillic horizons, such as Ankona, Gentry, Lokosee, Oldsmar, and Vero soils. These increases coupled with the tendency for the 14-angstrom intergrade mineral to decrease with increasing depth suggest that the 14-angstrom intergrade is the most stable mineral species in this weathering environment. Clay mineralogy of the soils in the survey area influences their use and management less than does the total clay content.

Engineering test data

Table 21 contains engineering test data made by the Soils Laboratory, Florida Department of Transportation, Bureau of Materials and Research, on some of the major soil series in the survey area. These tests were made to help evaluate the soils for engineering purposes. The classifications given are based on data obtained by mechanical analysis and by tests to determine liquid limits and plastic limits.

The mechanical analyses were made by combined sieve and hydrometer methods (3). In this method, the various grain-sized fractions are calculated on the basis of all the material in the soil sample, including that coarser than 2 millimeters in diameter. The mechanical analyses used in this method should not be used in naming textural classes of soils.

Compaction (or moisture-density) data are important in earthwork. If soil material is compacted at a successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed maximum dry density. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of the soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from a semisolid to a plastic state, and the liquid limit is the moisture content at which the soil material changes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. The data on liquid limit and plasticity index in this table are based on laboratory tests of soil samples.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (6). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or mapping units, of each soil series are described in the section "Soil maps for detailed planning."

Adamsville series

The Adamsville series is a member of the uncoated, hyperthermic family of Aquic Quartzipsamments. It consists of nearly level, somewhat poorly drained, sandy soils formed in unconsolidated marine sands. These soils occur as narrow, discontinuous elongated ridges slightly higher than and adjacent to large sloughs and marshes and as low knolls scattered throughout the flatwoods. Slopes range from 0 to 2 percent. The water table is within a depth of 20 to 40 inches for 2 to 6 months in most years and within a depth of 10 to 20 inches for up to 2 weeks in some years. It is within a depth of 60 inches for more than 9 months in most years.

Adamsville soils are associated with Basinger, Immokalee, Myakka, Pompano, and Tavares soils. Adamsville soils are not so wet as Basinger soils and lack a Bh horizon. They are distinguished from Immokalee and Myakka soils by lacking a spodic horizon. Adamsville soils are not so wet as Pompano soils and are more poorly drained than Tavares soils.

Typical pedon of Adamsville sand, from a wooded area about 200 feet east of the intersection of Pleasant Hill and Southport Roads (SW1/4NW1/4 sec. 8, T. 27 S., R. 29 E.):

- A1—0 to 4 inches; dark gray (10YR 4/1) sand; weak fine granular structure; very friable; common fine to medium and few coarse roots; contains many uncoated sand grains; very strongly acid; gradual wavy boundary.
- C1—4 to 16 inches; gray (10YR 6/1) sand; common medium faint pockets of light gray (10YR 7/1); few medium faint very pale brown (10YR 7/3) and few fine distinct reddish brown (5YR 5/3) mottles; single grained; loose; common fine and medium roots and few coarse roots; many uncoated sand grains; very strongly acid; gradual smooth boundary.
- C2—16 to 33 inches; light brownish gray (10YR 6/2) sand; white (10YR 8/1) sand pockets 1/2 to 1 inch in diameter; single grained; loose; few fine and medium roots; very strongly acid; gradual wavy boundary.
- C3—33 to 55 inches; white (10YR 8/1) sand; few medium distinct mottles of yellow (10YR 7/6) and dark brown (10YR 4/3) and few medium faint mottles of light brownish gray (10YR 6/2); single grained; loose; few fine to coarse roots; strongly acid; gradual smooth boundary.

C4—55 to 80 inches; white (10YR 8/1) sand; few fine faint yellow (10YR 8/6) mottles; single grained; loose; strongly acid.

Reaction ranges from very strongly acid to mildly alkaline in all horizons.

The A1 or Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 1. Thickness ranges from 4 to 20 inches. Where value is 3, thickness is less than 10 inches.

The C horizon has hue of 10YR, value of 5 through 8, and chroma of 3 or less. Mottles are in shades of red, gray, yellow, and brown.

Adamsville Variant

The Adamsville Variant is a member of the uncoated, hyperthermic family of Aquic Quartzipsamments. It consists of somewhat poorly drained soils formed in thick beds of sand and sapric organic materials. These soils occur as narrow, natural dikes bordering large lakes. They have a black organic layer underlying sandy materials. Slopes range from 0 to 5 percent. The water table is within 20 to 40 inches of the surface for 2 to 6 months in most years and between depths of 10 and 20 inches for up to 2 weeks in some years. It is within 60 inches for more than 9 months in most years.

Adamsville Variant soils are closely associated with Basinger, Holopaw, Pompano, Riviera, and Winder soils. They differ from all these soils by being better drained and by having a buried Oa horizon. In addition, they differ from Holopaw, Riviera, and Winder soils by lacking a Bt horizon.

Typical pedon of Adamsville Variant fine sand, 0 to 5 percent slopes, in a wooded area approximately 1,600 feet south of Thompkins Road and 3,000 feet west of State Highway 15 (SW1/4NE1/4 sec. 18, T. 25 S., R. 31 E.):

A—0 to 5 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

C—5 to 33 inches; light gray (10YR 7/1) fine sand; common coarse faint pale brown (10YR 6/3) mottles; single grained; loose; common medium and fine roots; very strongly acid; abrupt smooth boundary.

Oab—33 to 49 inches; black (10YR 2/1) muck; weak coarse and medium subangular blocky structure; friable; few large and many fine roots; many uncoated white sand grains; very strongly acid; clear smooth boundary.

Ab—49 to 53 inches; black (10YR 2/1) fine sand; weak medium granular structure; very friable; few fine roots; sand grains are coated with organic matter; strongly acid; gradual smooth boundary.

C—53 to 80 inches; gray (10YR 5/1) fine sand; single grained; loose; strongly acid.

Thickness of the sandy mantle overlying the Oab horizon ranges from 15 to 40 inches. Soil reaction ranges from very strongly acid to slightly acid in all horizons.

The A horizon ranges from 4 to 6 inches in thickness. It has hue of 10YR, value of 3 through 5, and chroma of 1. The A horizon in some pedons is mottled with black and in shades of gray and brown.

The C horizon has hue of 10YR, value of 6 through 8, and chroma of 1 through 3. It has mottles of black and in shades of gray and brown. Thickness ranges from 10 to 28 inches.

The Oab horizon ranges from 15 to 23 inches in thickness. It has hue of 10YR or 5YR, value of 2, and chroma of 1. In places it has dark reddish brown mottles. Fiber content ranges from 5 to 15 percent, rubbed.

The Ab horizon is 2 to 5 inches thick. It has hue of 10YR, value of 2 or 3, and chroma of 1.

The C horizon has hue of 10YR, value of 5 through 7, and chroma of 1. Mottles of gray and brown are in this horizon. Texture is sand or fine sand.

Ankona series

The Ankona series is a member of the sandy, siliceous, hyperthermic, ortstein family of Arenic Haplaquods. It consists of nearly level, poorly drained, very slowly permeable soils that formed in thick deposits of sandy and loamy sediments of marine origin. These soils are on broad flats and low knolls in the flatwoods. Slopes range from 0 to 2 percent. The water table is within a depth of 10 inches for 1 to 4 months and at a depth of 10 to 40 inches for 6 months or more in most years. It is perched above the spodic horizon early in the summer rainy season and following heavy rainfall in other seasons.

Ankona soils are associated with EauGallie, Immokalee, Myakka, Oldsmar, Pomona, Pompano, Placid, and Delray soils. Ankona soils have a spodic horizon below a depth of 30 inches, whereas EauGallie, Myakka, and Pomona soils have a spodic horizon within a depth of 30 inches. Ankona soils have an argillic horizon, whereas Immokalee, Myakka, Pompano, and Placid soils are sandy throughout. The argillic horizon in Ankona soils has lower base saturation than the argillic horizon in EauGallie, Delray, and Oldsmar soils. Ankona soils have an ochric epipedon, whereas Delray and Placid soils have mollic and umbric epipedons. In addition, Ankona soils have a cemented spodic horizon (orstein) which is lacking in all of the associated soils.

Typical pedon of Ankona fine sand having slope of 1 percent, from a wooded area about 900 feet east and 1,200 feet south of intersection of private road (Russell Ranch Road) and U.S. Highway 441, about 5 miles south of Kenansville (NW1/4SW1/4 sec. 15, T. 31 S., R. 34 E.):

A11—0 to 5 inches; black (10YR 2/1) fine sand; weak medium granular structure; friable; many fine, medium, and coarse roots; many uncoated white sand grains; strongly acid; gradual smooth boundary.

A12—5 to 9 inches; dark gray (10YR 4/1) fine sand; common medium distinct (10YR 6/1) mottles; single grained; loose; common medium and fine roots; medium acid; gradual smooth boundary.

A21—9 to 14 inches; gray (10YR 6/1) fine sand; common coarse distinct dark gray (10YR 4/1), gray (10YR 5/1), and grayish brown (10YR 5/2) mottles; single grained; loose; common medium and fine roots; medium acid; gradual smooth boundary.

A22—14 to 32 inches; light gray (10YR 7/1) fine sand; single grained; loose; few medium and fine roots; few medium very dark gray (10YR 3/1) and dark gray (10YR 4/1) streaks along walls of root channels; slightly acid; abrupt wavy boundary.

B21h—32 to 36 inches; black (N 2/0) loamy sand; massive in place, parts to moderate medium subangular blocky structure; friable; few uncoated sand grains; few coarse very dark grayish brown (10YR 3/2) pockets of fine sand; extremely acid; gradual smooth boundary.

B22h—36 to 40 inches; dark reddish brown (5YR 2/2) loamy sand; few medium faint dark reddish brown (5YR 3/3) and reddish brown (5YR 4/3) mottles; massive in place, parts to moderate medium subangular blocky structure; moderately cemented in about 90 percent of the pedon; firm; extremely acid; gradual smooth boundary.

B3&Bh—40 to 47 inches; dark brown (10YR 4/3) loamy sand; few medium faint dark brown (10YR 3/3) and dark reddish brown (5YR 3/3) mottles; moderate fine granular structure; friable; many coarse black (10YR 2/1) spodic fragments 1/4 to 1 inch in diameter; very strongly acid; gradual smooth boundary.

B2lt—47 to 51 inches; brown (10YR 5/3) fine sandy loam; few fine faint grayish brown (10YR 5/2), gray (10YR 5/1), and light brownish gray (10YR 6/2) mottles; weak medium granular structure; friable; few medium dead roots; very strongly acid; gradual irregular boundary.

B2tg—51 to 80 inches; gray (5Y 6/1) sandy clay loam; common medium faint light gray (5YR 7/1) and gray (5YR 5/1) mottles; massive in place, parts to weak medium subangular blocky structure; friable, slightly sticky; few medium dead roots; sand grains are well bridged and coated with clay; very strongly acid.

Solum thickness ranges from 62 to more than 80 inches. Soil reaction ranges from extremely acid to strongly acid in all horizons except where the soil has been limed.

The A1 horizon has colors in hue of 10YR, value of 2 through 4, and chroma of 1.

The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 or 2. The A horizon ranges from 30 to 50 inches in thickness.

The B2h horizon has hue of 5YR, value of 2 through 3, and chroma of 1 through 3; hue of 7.5YR, value of 3, and chroma of 2; hue of N and value of 2; or hue of 10YR, value of 2 or 3, and chroma of 1 or 2. This horizon is noncemented to strongly cemented. More than half of the B2h horizon in each pedon is weakly to strongly cemented. Consistence ranges from friable to firm. Texture ranges from sand to loamy fine sand, and thickness ranges from 6 to 24 inches. The B3&Bh horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. In some pedons, it contains weakly cemented bodies (spodic fragments) that are the same texture and color as the Bh horizon. Texture of the B3&Bh horizon ranges from sand to loamy fine sand, and thickness ranges from 7 to 30 inches.

Some pedons have an A'2 horizon above the Bt horizon. Where present, this horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Texture is sand or fine sand. Thickness ranges to 12 inches.

The B2t horizon has hue of 10YR, value of 5 through 7, and chroma of 1 through 3; hue of 5Y, value of 5 or 6, and chroma of 1 or 2; hue of 2.5Y, value of 5 or 6, and chroma of 2; or hue of N and value of 5 through 7. In some pedons, this horizon has mottles of gray, brown, and yellow. Texture ranges from sandy loam to sandy clay loam.

A Cg horizon is present above a depth of 80 inches in some pedons. Color is similar to that of the Bt horizon, and texture ranges from sand to loamy sand.

Basinger series

The Basinger series is a member of the siliceous, hyperthermic family of Spodic Psammaquents. It consists of nearly level, poorly drained, sandy soils formed in thick beds of marine sediments. These soils normally occur in sloughs, along poorly defined drainageways, and in depressions in the flatwoods. Slopes range from 0 to 2 percent. The water table is within 10 inches of the surface for 2 to 6 months annually and between depths of 10 and 30 inches for more than 6 months in most years. Depressions are covered with standing water for periods of 6 to 9 months or more in most years.

Basinger soils are associated with EauGallie, Immokalee, Myakka, Pompano, Smyrna, and Vero soils. Basinger soils have a weakly developed Bh horizon, whereas EauGallie, Immokalee, Myakka, Smyrna, and Vero soils have a well developed, weakly cemented spodic horizon. EauGallie and Vero soils also differ from Basinger soils by having a Bt horizon. Basinger soils differ from Pompano soils by having a Bh horizon.

Typical pedon of Basinger fine sand, from a grassy area in a slough approximately 20 feet northwest of a dirt road on Bronson, Inc. Ranch, 5.75 miles southwest of the over-

pass of Canoe Creek Road and the Sunshine State Parkway, 16.0 miles south of St. Cloud (SW1/4NE1/4 sec. 34, T. 28 S., R. 30 E.):

A11—0 to 4 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; common fine and medium roots; organic matter content is about 1 percent; very strongly acid; gradual wavy boundary.

A12—4 to 7 inches; dark gray (10YR 4/1) fine sand; few medium faint gray (10YR 6/1) mottles; single grained; loose; many medium roots; very strongly acid; gradual wavy boundary.

A2—7 to 19 inches; light gray (10YR 7/1) fine sand; few fine faint dark brown (10YR 3/3) and light brownish gray (10YR 6/2) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

Bh—19 to 35 inches; dark brown (7.5YR 4/2) fine sand; many medium distinct strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) mottles; single grained; loose; common medium black and dark reddish brown fragments of weakly cemented fine sand; very strongly acid; clear wavy boundary.

C1—35 to 58 inches; light gray (10YR 7/2) fine sand; few fine faint brown (10YR 4/3) and light yellowish brown (10YR 5/6) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

C2—58 to 80 inches; brown (10YR 4/3) fine sand; few medium faint very dark grayish brown (10YR 3/2) mottles; single grained; loose; very strongly acid.

Soil reaction ranges from very strongly acid to slightly acid throughout. Thickness of the A horizon is less than 40 inches. Fine sand extends to a depth of 80 inches or more.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1. Mottles in this horizon are in shades of gray or brown. The A1 horizon ranges from 2 to 8 inches in thickness.

The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 through 3. Most mottles are in shades of brown. Horizon thickness ranges from 6 to 30 inches.

The Bh horizon has hue of 10YR, value of 3 through 6, and chroma of 2 or 3, or hue of 7.5YR, value of 3 through 6, and chroma of 2 or 4. Mottles are in shades of gray, brown, red, and yellow. Weakly cemented fragments of black, very dark brown, and dark reddish brown fine sand occur throughout this horizon. Thickness ranges from 6 to 16 inches.

The C horizon has hue of 10YR, value of 4 through 7, and chroma of 1 through 3. Mottles are gray, brown, yellow, or red.

Candler series

The Candler series is a member of the uncoated, hyperthermic family of Typic Quartzipsamments. It consists of nearly level to strongly sloping, excessively drained, sandy soils formed in thick, sandy marine deposits. These soils occur on undulating ridges in the sandhills. Slopes range from 0 to 12 percent. The water table is below a depth of 72 inches throughout the year.

Candler soils are associated with Adamsville, Paola, St. Lucie, Satellite, and Tavares soils. Candler soils differ from Adamsville soils by having lamellae and by being much better drained. Candler soils are distinguished from Paola soils by having thin, discontinuous lamellae at a depth of 55 to 80 inches and by lacking an albic horizon. Candler soils differ from St. Lucie soils by lacking a C horizon and by having lamellae within 80 inches of the surface. Candler soils are distinguished from Satellite and Tavares soils by being better drained, by lacking a C horizon, and by having lamellae within 80 inches of the surface.

Typical pedon of Candler sand, 5 to 12 percent slopes, in a wooded area approximately 250 feet south of Sand Hill Road and 1,400 feet west of Florida Highway 545 (NW1/4NW1/4 sec. 22, T. 25 S., R. 26 E.):

- A1—0 to 3 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; many fine roots; strongly acid; clear wavy boundary.
 A21—3 to 6 inches; yellowish brown (10YR 5/4) sand; single grained; loose; many fine roots; medium acid; clear wavy boundary.
 A22—6 to 17 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few fine roots; medium acid; gradual wavy boundary.
 A23—17 to 35 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; few fine roots to a depth of 17 or 18 inches; medium acid; gradual wavy boundary.
 A24—35 to 62 inches; brownish yellow (10YR 6/6) sand; single grained; loose; strongly acid; clear wavy boundary.
 A24&B—62 to 80 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few discontinuous lamellae of reddish yellow (10YR 6/8) fine sandy loam, 1/16 to 1/4 inch thick, between depths of 62 and 66 inches; strongly acid.

Thickness of the solum is 80 inches or more. Reaction ranges from very strongly acid to medium acid in all horizons.

The A1 horizon has hue of 10YR, value of 4, and chroma of 2 or 3. It ranges in thickness from 3 to 8 inches.

The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 3 through 6. It ranges in thickness from 48 to 65 inches. Gray, light gray, and white, uncoated sand grains occur throughout this horizon.

The A2&B horizon has hue of 10YR, value of 6 or 7, and chroma of 3 to 8. The A2 part of this horizon ranges from 2 to 9 inches in thickness between lamellae. The lamellae range from 1/2 inch to 6 inches in length and from 1/16 to 1 inch in thickness. Total thickness of the lamellae is 1 to 4 inches. Pockets of light gray (10YR 7/1) or white (10YR 8/1) fine sand occur in this horizon.

In some pedons a continuous Bt horizon occurs at a depth of 82 inches or more. This horizon is red and yellowish red.

Cassia series

The Cassia series is a member of the sandy, siliceous, hyperthermic family of Typic Haplohumods. It consists of nearly level, somewhat poorly drained soils formed in thick beds of marine sands. The soils occur as low ridges throughout the flatwoods. Slopes range from 0 to 2 percent. The water table is at a depth of 15 to 40 inches for about 6 months in most years and recedes below a depth of 40 inches in very dry seasons.

Cassia soils are associated with Immokalee, Myakka, Pomello, and St. Lucie soils. Cassia soils differ from Immokalee soils by being better drained; by having a thinner, lighter colored A1 horizon; and by having a Bh horizon at a depth of less than 30 inches. Cassia soils are better drained than Myakka soils and have a thinner, lighter colored A1 horizon. Cassia soils differ from Pomello soils by having an A horizon less than 30 inches thick. Cassia soils are more poorly drained than St. Lucie soils and have a spodic horizon.

Typical pedon of Cassia fine sand, in rangeland 0.6 mile east of Holopaw and 0.8 mile south of U.S. Highway 441 (SW1/4SE1/4 sec. 13, T. 27 S., R. 32 E.):

- A1—0 to 3 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

A2—3 to 20 inches; white (10YR 8/1) fine sand; common medium distinct light brownish gray (10YR 6/2) mottles; single grained; loose; common medium and few fine roots; light brownish gray (10YR 6/2) streaks along root channels; strongly acid; gradual smooth boundary.

B21h—20 to 22 inches; dark reddish brown (5YR 3/2) loamy fine sand; massive, crushes to moderate medium subangular blocky structure; firm; many fine and few medium roots; common medium distinct pockets of very dark gray (10YR 3/1) fine sand; sand grains are coated and weakly cemented with organic matter; very strongly acid; clear wavy boundary.

B22h—22 to 25 inches; dark reddish brown (5YR 3/4) fine sand; common medium distinct dark reddish brown (5YR 3/2) mottles; massive, crushes to moderate medium subangular blocky structure; firm; many fine and few medium roots; sand grains are coated and weakly cemented with organic matter; very strongly acid; clear wavy boundary.

B23h—25 to 28 inches; reddish brown (5YR 4/4) fine sand; common medium distinct dark reddish brown (5YR 3/3) mottles; massive, crushes to weak medium granular structure; friable; very strongly acid; clear wavy boundary.

A'2—28 to 53 inches; yellowish brown (10YR 5/4) fine sand; common medium faint light yellowish brown (10YR 6/4) mottles in lower part of horizon; single grained; loose; dark brown (7.5YR 3/2) stains along root channels; strongly acid; gradual wavy boundary.

B'21h—53 to 65 inches; dark brown (7.5YR 4/2) and dark reddish gray (5YR 4/2) loamy fine sand; common medium distinct pinkish gray (7.5YR 6/2) mottles; weak fine granular structure; friable; few medium and fine roots; common medium black (10YR 2/1) bodies of fine sand weakly cemented with organic matter; strongly acid; gradual wavy boundary.

B'22h—65 to 88 inches; black (10YR 2/1) fine sand; weak medium subangular blocky structure; firm; sand grains are coated and weakly cemented with organic matter; strongly acid.

Soil reaction ranges from very strongly acid to medium acid in the A1 horizon and from very strongly acid to strongly acid in the other horizons.

The Ap or A1 horizon ranges from 3 to 5 inches in thickness. It has hue of 10YR, value of 5 or 6, and chroma of 1 or less.

The A2 horizon has hue of 10YR, value of 7 or 8, and chroma of 1 or less. Thickness of the A2 horizon ranges from 15 to 21 inches. Mottles in shades of gray and brown occur throughout this horizon.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1; hue of 7.5YR, value of 3, and chroma of 2; hue of 5YR, value of 2 or 3, and chroma of 1 through 3; or hue of N and value of 2 or 3. It has mottles in shades of gray, brown, and red. Thickness of the Bh horizon ranges from 5 to 13 inches. Texture is fine sand or loamy fine sand.

A B3 horizon is present in some pedons. It ranges in thickness to 4 inches. It has hue of 10YR, value of 4 or 5, and chroma of 3 or 4, or hue of 7.5YR, value of 4, and chroma of 4. Some pedons have mottles and weakly cemented Bh fragments in this horizon that are dark reddish brown or dark brown.

The A'2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 through 4. Thickness ranges from 11 to 26 inches. Not all pedons contain an A'2 horizon.

The B'2h horizon, where present, has hue of 10YR, value of 2 or 3, and chroma of 1 through 3; hue of 7.5YR, value of 4, and chroma of 2; or hue of 5YR, value of 3 or 4, and chroma of 1 or 2. In some pedons this horizon extends to a depth of more than 80 inches. It is noncemented to weakly cemented with organic matter. Texture is fine sand or loamy fine sand.

Some pedons have a C horizon. The C horizon has hue of 10YR, value of 5 through 8, and chroma of 1 through 4, or hue of N and value of 5 through 8. This horizon is not in pedons in which the B'2h horizon extends to a depth of more than 80 inches.

Delray series

The Delray series is a member of the loamy, mixed, hyperthermic family of Grossarenic Argiaquolls. It consists of very poorly drained soils that formed in thick beds of sandy and loamy marine sediments. These soils occur in depressions within the flatwoods and at the edges of large lakes that have fluctuating water levels. Slopes range from 0 to 2 percent. Water stands on the surface for 2 or 6 months in most years and is within a depth of 10 inches for 6 to 9 months in most years.

Delray soils are closely associated with Nittaw, Floridana, Holopaw, Malabar, Placid, Pompano, Riviera, and Winder soils. Delray soils have an albic horizon and an argillic horizon below a depth of 40 inches, whereas Nittaw soils lack an albic horizon and have an argillic horizon within a depth of 20 inches. Delray soils have an argillic horizon below a depth of 40 inches, whereas Floridana soils have the argillic horizon at a depth of 20 to 40 inches. Delray soils differ from Holopaw soils by being more poorly drained and by having a mollic epipedon. Delray soils differ from Malabar soils by being more poorly drained, by lacking a Bir horizon, and by having a mollic epipedon. Delray soils differ from Placid soils by having an argillic horizon below a depth of 40 inches. Delray soils differ from Pompano soils by being more poorly drained and by having a mollic epipedon and an argillic horizon below a depth of 40 inches. Delray soils differ from Riviera and Winder soils by being more poorly drained, by not having tongues of the albic horizon extending into the argillic horizon, and by having a mollic epipedon.

Typical pedon of Delray loamy fine sand, from a grassy area about 1/4 mile west of the northwest shore of Lake Winder (SE1/4SE1/4 sec. 36, T. 25 S., R. 34 E.):

- A11—0 to 6 inches; black (10YR 2/1) loamy fine sand; very high organic matter content; moderate medium granular structure; friable; many fine roots; slightly acid; gradual wavy boundary.
- A12—6 to 14 inches; black (10YR 2/1) loamy fine sand; medium content of organic matter; weak fine granular structure; very friable; common fine roots; slightly acid; gradual wavy boundary.
- A2—14 to 44 inches; gray (10YR 5/1) fine sand; single grained; loose; few fine roots; slightly acid; gradual wavy boundary.
- B21tg—44 to 50 inches; dark gray (10YR 4/1) fine sandy loam; few fine faint pale brown (10YR 6/3) mottles; weak fine granular structure; friable; neutral; abrupt smooth boundary.
- B22tg—50 to 62 inches; dark grayish brown (10YR 4/2) sandy clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; sand grains coated and bridged with clay; mildly alkaline; gradual wavy boundary.
- B3g—62 to 80 inches; grayish brown (10YR 5/2) loamy fine sand; few fine distinct brownish yellow (10YR 6/8) mottles; massive; friable; mildly alkaline.

Solum thickness ranges from 50 to more than 80 inches. Reaction ranges from slightly acid in the A horizon to neutral or mildly alkaline in the Btg and C horizons.

The A1 horizon is 14 to 21 inches thick. It has hue of 10YR, value of 2 or 3, and chroma of 1.

The A2 horizon is 23 to 30 inches thick. It has hue of 10YR, value of 4 through 6, and chroma of 1 or 2.

The B2tg horizon is 8 to 21 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. Texture is fine sandy loam or sandy clay

loam. Few to common fine and medium yellow, brown, and gray mottles occur throughout this horizon.

The B3g horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. In some pedons a Cg horizon with hue of 10YR, value of 6 or more, and chroma of 1 underlies the B3g horizon. Texture is loamy fine sand or fine sandy loam.

EauGallie series

The EauGallie series is a member of the sandy, siliceous, hyperthermic family of Alfic Haplaquods. It consists of poorly drained soils that formed in thick beds of sandy and loamy marine sediments. These soils occur in broad, nearly level areas and low ridges in the flatwoods. Slopes range from 0 to 2 percent. The water table rises to within 10 inches of the surface for periods of 1 to 4 months in most years and is within a depth of 40 inches for 6 months or more.

EauGallie soils are closely associated with Immokalee, Malabar, Myakka, Oldsmar, Ona, Smyrna, Vero, and Wauchula soils. EauGallie soils have an argillic horizon below the spodic horizon, whereas Immokalee, Myakka, Ona, and Smyrna soils lack an argillic horizon. EauGallie soils differ from Malabar soils by having a spodic horizon instead of a Bir horizon above an argillic horizon. EauGallie soils differ from Oldsmar soils by having an A horizon less than 30 inches thick, whereas Oldsmar soils have an A horizon more than 30 inches thick. EauGallie soils have an argillic horizon below a depth of 40 inches, whereas Vero and Wauchula soils have an argillic horizon above a depth of 40 inches. Additionally, the base saturation of the argillic horizon in EauGallie soils is more than 35 percent, whereas in Wauchula soils it is less than 35 percent.

Typical pedon of EauGallie fine sand, from a pasture 500 feet east of State Highway 523 and about 2.4 miles west of the Sunshine State Parkway (SW1/4SE1/4 sec. 7, T. 29 S., R. 32 E.):

- A1—0 to 6 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; many fine, medium, and coarse roots; very strongly acid; gradual wavy boundary.
- A21—6 to 13 inches; gray (10YR 6/1) fine sand; common coarse faint gray (10YR 5/1) and few coarse distinct very dark gray (10YR 3/1) mottles; dark grayish brown stains along root channels; single grained; loose; few fine and medium roots; very strongly acid; gradual wavy boundary.
- A22—13 to 23 inches; light gray (10YR 7/1) fine sand; few medium distinct dark grayish brown (10YR 4/2) and few medium prominent dark reddish brown (5YR 3/3) mottles; single grained; loose; very strongly acid; abrupt smooth boundary.
- B21h—23 to 27 inches; black (N 2/0) fine sand; moderate medium granular structure; friable; common fine roots; sand grains coated with organic matter; very strongly acid; gradual wavy boundary.
- B22h—27 to 34 inches; black (5YR 2/1) fine sand; common coarse faint dark brown (7.5YR 3/2) mottles; weak fine granular structure; friable; few medium roots; medium acid; gradual wavy boundary.
- B3—34 to 49 inches; brown (10YR 5/3) fine sand; common medium distinct dark brown (7.5YR 3/2) mottles; single grained; loose; common indurated iron concretions 1/4 inch to 2 1/2 inches in diameter; medium acid; clear irregular boundary.
- A*2—49 to 54 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; slightly acid; abrupt wavy boundary.
- B*tg—54 to 82 inches; gray (N 6/0) sandy clay loam; few fine distinct olive gray (2.5YR 5/2) stains along root channels; weak medium subangular blocky structure; slightly sticky; few medium roots; neutral.

Solum thickness ranges from 45 to 80 inches or more. Reaction ranges from very strongly acid to medium acid in the A and Bh horizons and from medium acid to mildly alkaline in the B'tg and C horizons.

The A1 horizon is 3 to 6 inches thick. It has hue of 10YR, value of 2 through 4, and chroma of 1.

The A2 horizon is 8 to 23 inches thick. It has hue of 10YR, value of 5 through 8, and chroma of 2 or less.

The B2h horizon is 9 to 15 inches thick. It has hue of 5YR, value of 2 or 3, and chroma of 1 through 3; hue of 7.5YR, value of 3, and chroma of 2; hue of 10YR, value of 2, and chroma of 1; or hue of N and value of 2.

The B3 horizon is 5 to 16 inches thick. It has hue of 10YR, value of 4 through 7, and chroma of 2 through 4.

The A2 horizon is 0 to 11 inches thick. Where present, it has hue of 10YR, value of 5 through 8, and chroma of 1 through 3. Texture is sand or fine sand.

The B'tg horizon has hue of 10YR or 5YR, value of 5 or 6, and chroma of 1 or 2; hue of 2.5Y, value of 5 or 6, and chroma of 2; or hue of N and value of 5 or 6. Texture is sandy loam or sandy clay loam.

Some pedons have a C horizon below a depth of 70 inches. Color is in hue of 10YR or 2.5YR, value of 5 or 6, and chroma of 1 or 2. Texture is fine sand or loamy sand.

Floridana series

The Floridana series is a member of the loamy, siliceous, hyperthermic family of Arenic Argiaquolls. It consists of very poorly drained soils that formed in thick beds of sandy and loamy marine sediments. These soils occur in depressions in the flatwoods and at the edges of large lakes that have fluctuating water levels. Slopes range from 0 to 2 percent. Water stands above the surface for more than 6 months in most years.

Floridana soils are closely associated with Nittaw, Delray, Holopaw, Pompano, Riviera, and Winder soils. Floridana soils differ from Nittaw soils by having an albic horizon. Floridana soils have a Bt horizon within a depth of 20 to 40 inches, whereas Delray soils have a Bt horizon below a depth of 40 inches. Floridana soils differ from Holopaw, Pompano, Riviera, and Winder soils by having a mollic epipedon. Additionally, Winder soils have a Bt horizon within a depth of 20 inches, and Pompano soils have sandy texture to a depth of 80 inches or more.

Typical pedon of Floridana fine sand, from a grassy area 2 miles west of Peavine trail and 1,000 feet south of Florida Highway 60 (NW1/4NW1/4 sec. 32, T. 31 S., R. 33 E.):

A11—0 to 10 inches; black (10YR 2/1) fine sand; weak fine granular structure; friable; common fine and medium roots; slightly acid; gradual smooth boundary.

A12—10 to 15 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; friable; common fine roots; medium acid; clear wavy boundary.

A2—15 to 24 inches; grayish brown (10YR 5/2) fine sand; few medium prominent brownish yellow (10YR 6/6) and common coarse faint gray (10YR 5/1) mottles; single grained; loose; medium acid; abrupt wavy boundary.

B21tg—24 to 32 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium distinct brown (10YR 5/3) and yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; neutral; gradual wavy boundary.

B22tg—32 to 41 inches; gray (10YR 5/1) sandy clay loam; weak medium subangular blocky structure; friable; coarse lenses of light gray (10YR 7/1) fine sand; neutral; gradual wavy boundary.

B3g—41 to 48 inches; gray (10YR 5/1) sandy loam; common coarse faint dark gray (10YR 4/1) and common medium distinct yellowish brown

(10YR 5/6) mottles; weak medium subangular blocky structure; friable; neutral; gradual wavy boundary.

Cg—48 to 80 inches; white (10YR 8/1) sand; single grained; loose; mildly alkaline.

Solum thickness ranges from 48 to more than 80 inches. Soil reaction ranges from strongly acid to neutral in the A horizon and from medium acid to mildly alkaline in the Btg and Cg horizons.

The A1 horizon ranges from 10 to 21 inches in thickness. It has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; hue of 7.5YR, value of 3, and chroma of 2; or hue of N and value of 2 or 3.

The A2 horizon is 8 to 15 inches thick. It has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Few to common fine or medium, gray and brownish yellow mottles occur in this layer.

The B2tg horizon is 6 to 14 inches thick. It has hue of 10YR, value of 4 through 6, and chroma of 1 or 2. Texture is sandy loam or sandy clay loam. Few to common medium to fine, gray, yellow, and brown mottles occur throughout this horizon.

The B3g horizon is 5 to 40 inches thick. In some pedons this horizon extends below a depth of 80 inches. It has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. Texture is sandy loam or loamy fine sand. Few to common medium or fine, gray, yellow, and brown mottles occur throughout this horizon.

The Cg horizon has hue of 10YR, value of 5 through 8, and chroma of 1. This horizon is not in all pedons. Where present, it occurs at a depth of 37 to 75 inches and extends to a depth of more than 80 inches. Texture is fine sand or sand.

Gentry series

The Gentry series is a member of the loamy, siliceous, hyperthermic family of Arenic Argiaquolls. It consists of very poorly drained, moderately permeable soils that formed in loamy sediments of marine origin. These soils occur in narrow to broad drainageways, on flood plains, and in small depressions. Slopes are dominantly less than 1 percent but range to 2 percent. The water table is within a depth of 10 inches or is above the surface for more than 6 months in most years. Flooding occurs frequently during the summer rainy season.

Gentry soils are closely associated with Delray, Floridana, Nittaw, Riviera, Kaliga, and Winder soils. Delray, Floridana, Riviera, and Winder soils have an albic horizon. Additionally, Riviera and Winder soils lack a mollic epipedon. Kaliga soils are organic. Nittaw soils have clay texture.

Typical pedon of Gentry fine sand, from a cypress swamp approximately 1.75 miles southeast of Lake Russell, 1.9 miles west of South Port Canal, and 5.5 miles south of Kissimmee Park (SW1/4SE1/4SW1/4 sec. 23, T. 27 S., R. 29 E.):

A11—0 to 7 inches; black (10YR 2/1) fine sand; few fine faint very dark gray (10YR 3/1) mottles; moderate medium granular structure; friable; many fine medium and coarse roots; few light brownish gray (10YR 6/2) pockets of fine sand with many uncoated sand grains; strongly acid; clear wavy boundary.

A12—7 to 24 inches; black (10YR 2/1) fine sand; common medium distinct very dark grayish brown (10YR 3/2) and gray (10YR 5/1) mottles; weak medium subangular blocky structure; friable; common coarse distinct light brownish gray (10YR 6/2) pockets of fine sand; many fine, medium, and coarse roots; strongly acid; clear irregular boundary.

B21t—24 to 37 inches; gray (10YR 5/1) fine sandy loam; common medium distinct yellowish brown (10YR 5/4, 10YR 5/6) and few fine faint very dark gray (10YR 3/1) and dark gray (10YR 4/1) mottles;

weak medium subangular blocky structure; sticky; few medium and coarse roots; common coarse distinct very dark gray (10YR 3/1) vertical tongues of fine sand extend from overlying horizon; common fine and medium distinct light gray (10YR 7/1) pockets of fine sand; sand grains are coated and bridged with clay; medium acid; gradual wavy boundary.

B2t—37 to 64 inches; gray (10YR 5/1) fine sandy loam; few fine faint dark gray (10YR 4/1) and common coarse prominent brownish yellow (10YR 6/6, 10YR 6/8) mottles; weak medium subangular blocky structure; sticky; few medium and coarse roots; many medium faint grayish brown (10YR 5/2) and light gray (10YR 7/1) pockets of fine sand; sand grains are bridged and coated with clay; medium acid; gradual irregular boundary.

Cg—64 to 80 inches; light gray (10YR 6/1) fine sand; few fine distinct yellow (10YR 7/6) and many coarse faint light gray (10YR 7/1) mottles; single grained; nonsticky; slightly acid.

Gentry soils range from strongly acid to neutral in the A horizon, from medium acid to moderately alkaline in the B2t horizon, and from slightly acid to moderately alkaline in the C horizon. Solum thickness ranges from 64 to more than 80 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2, or hue of N and value of 1 or 2. Some pedons have few to common fine to coarse mottles of very dark gray, gray, or grayish brown, and pockets of gray, light gray, white, or grayish brown uncoated sand grains. Texture is sand or fine sand. Thickness ranges from 20 to 28 inches.

The B2tg horizon has hue of 10YR, value of 3 through 5, and chroma of 1 or 2; hue of 5Y, value of 3 or 4, and chroma of 1 or 2; hue of 2.5YR, value of 3 or 4, and chroma of 2; or hue of N and value of 3 or 4. Tongues of black or very dark gray from the A horizon extend into this horizon. Tongues range from 0.5 inch to 2 inches in diameter and from 1.5 to 30 inches in length. Few to common fine to coarse gray, grayish brown, and olive gray pockets of sand or fine sand are in this horizon in some pedons. Mottles of yellow, gray, brown, and olive are also in this horizon in some pedons. Texture, excluding tongues, is sandy loam, fine sandy loam, or sandy clay loam.

The Cg horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2; hue of 2.5YR, value of 4 through 6, and chroma of 2; or hue of N and value of 4 through 6. Texture ranges from sand to fine sandy loam.

Holopaw series

The Holopaw series is a member of the loamy, siliceous, hyperthermic family of Grossarenic Ochraqualfs. It consists of poorly drained soils that formed in stratified, unconsolidated marine sand and loamy mineral materials. These nearly level soils occur on flats and in poorly defined drainageways. Slopes range from 0 to 2 percent. The water table is within 10 inches of the surface for 2 to 6 months in most years and within 40 inches most of the rest of the year.

Holopaw soils are closely associated with EauGallie, Immokalee, Malabar, Myakka, Oldsmar, Pineda, Pompano, and Riviera soils. Holopaw soils differ from EauGallie and Oldsmar soils by lacking a Bh horizon. Holopaw soils differ from Immokalee and Myakka soils by lacking a Bh horizon and by having a Bt horizon. Holopaw soils differ from Malabar and Pineda soils by lacking a Bir horizon. Additionally, Pineda soils have a Bt horizon within a depth of 40 inches. Holopaw soils differ from Pompano soils by having a Bt horizon within a depth of 40 to 80 inches, whereas Pompano soils are sandy to a depth of 80 inches or more. Holopaw soils differ from Riviera soils by having the Bt horizon below a depth of 40 inches and by lacking glossic properties.

Typical pedon of Holopaw fine sand, from a grassy area 1,400 feet south of Florida Highway 525 and about 2.5 miles west of Florida Highway 525A, about 300 feet east of fish camp (SE1/4NE1/4 sec. 26, T. 26 S., R. 29 E.):

A11—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sand; moderate medium granular structure; friable; many fine roots; medium acid; gradual smooth boundary.

A12—3 to 8 inches; dark gray (10YR 4/1) fine sand; weak medium granular structure; very friable; medium acid; gradual smooth boundary.

A21g—8 to 19 inches; light gray (10YR 7/1) fine sand; common medium distinct yellowish brown (10YR 5/6) mottles; single grained; loose; neutral; gradual smooth boundary.

A22g—19 to 36 inches; light gray (10YR 7/1) fine sand; common coarse distinct dark grayish brown (10YR 4/2) and many coarse distinct yellowish brown (10YR 5/4) mottles; single grained; loose; neutral; gradual smooth boundary.

A23g—36 to 47 inches; grayish brown (10YR 5/2) fine sand; few fine faint dark grayish brown (10YR 4/2) mottles; single grained; loose; slightly acid; abrupt wavy boundary.

B2tg—47 to 55 inches; grayish brown (2.5YR 5/2) sandy clay loam; weak medium subangular blocky structure; slightly sticky; sand grains coated and bridged with clay; neutral; gradual wavy boundary.

B3g—55 to 60 inches; dark grayish brown (5Y 5/1) sandy loam; massive; friable; common pockets and streaks of loamy sand and sandy clay loam; neutral; gradual wavy boundary.

Cg—60 to 80 inches; gray (10YR 5/1) loamy sand; massive; friable; common pockets and lenses of sand; slightly acid.

Solum thickness ranges from 50 to 80 inches or more. Soil reaction ranges from strongly acid to slightly acid in the A1 horizon and from slightly acid to mildly alkaline below.

The A1 horizon is 3 to 10 inches thick. It has hue of 10YR, value of 2 through 4, and chroma of 1 or 2.

The A2 horizon ranges in thickness from 34 to 60 inches. It has hue of 10YR, value of 4 through 8, and chroma of 1 or 2. Few to many fine, medium, and coarse, yellow and brown mottles occur throughout this horizon.

The Btg horizon is 7 to 18 inches thick. It has hue of 10YR or 5Y, value of 5 or 6, and chroma of 1 or 2. Few to common brown and yellow mottles occur throughout the horizon.

The B3g horizon ranges from 3 to 8 inches in thickness. It has hue of 10YR or 5Y, value of 4 through 6, and chroma of 1 or 2. Few to common brown and yellow mottles occur throughout the horizon.

The Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2; hue of 2.5Y, value of 5 or 6, and chroma of 2; or hue of N and value of 5 or 6. Texture ranges from sand to loamy fine sand.

Hontoon series

The Hontoon series is a member of the dysic, hyperthermic family of Typic Medisaprists. It consists of nearly level, very poorly drained, organic soils that formed in thick beds of hydrophytic nonwoody plant remains. These soils occur in low, wet areas and in freshwater marshes and swamps. Slopes are less than 1 percent. The water table is at or above the surface except during extended dry periods.

Hontoon soils are closely associated with Basinger, Immokalee, Myakka, Placid, Samsula, and Kaliga soils. Hontoon soils differ from Basinger, Immokalee, Myakka, and Placid soils in that they are organic rather than mineral. Hontoon soils differ from Samsula and Kaliga soils by lacking mineral horizons within a depth of 51 inches.

Typical pedon of Hontoon muck, from a wooded area 1 mile south of Oak Island and 1 mile west of Sand Hill Road (NE1/4NE1/4 sec. 16, T. 25 S., R. 27 E.):

- Oa1—0 to 5 inches; dark reddish brown (5YR 2/2) rubbed and unrubbed muck; about 80 percent fiber, 12 percent rubbed; weak fine granular structure; friable; many fine and medium roots; few large roots; few partially decayed wood fragments 2 or 3 inches in diameter; sodium pyrophosphate extract is very pale brown (10YR 7/4); extremely acid; clear smooth boundary.
- Oa2—5 to 29 inches; black (5YR 2/1) rubbed and unrubbed muck; about 30 percent fiber, 10 percent rubbed; massive; friable; common very fine and few fine and medium roots; sodium pyrophosphate extract is pale brown (10YR 6/3); extremely acid; clear wavy boundary.
- Oa3—29 to 70 inches; dark reddish brown (5YR 2/2) rubbed and unrubbed muck; about 40 percent fiber, 8 percent rubbed; massive; friable; common fine and few medium roots; few carbon particles 2 to 5 mm across; few partially decomposed limbs and roots; sodium pyrophosphate extract is pale brown (10YR 6/3); extremely acid.

Thickness of the organic matter exceeds 51 inches. Soil reaction is less than 4.5 in all horizons in 0.01M calcium chloride. Oe horizons occur in some pedons; where present, they have hue of 10YR or 5YR, value of 2 or 3, and chroma of 1 through 3. Thickness ranges from 0 to 10 inches.

The Oa horizon has hue of 10YR or 5YR, value of 3 or less, and chroma of 2 or less. The fiber content is less than 16 percent of its volume after rubbing. Sodium pyrophosphate extract color is in hue of 10YR with value of 2 through 4 and chroma of 4 or less, with value of 5 and chroma of 2 through 8, with value of 6 and chroma of 3 through 8, or with value of 7 and chroma of 4 through 8.

Immokalee series

The Immokalee series is a member of the sandy, siliceous, hyperthermic family of Arenic Haplaquods. It consists of nearly level, poorly drained, deep, sandy soils formed in thick beds of marine sands. These nearly level soils occur in broad areas throughout the flatwoods. Slopes range from 0 to 2 percent. The water table is within 10 inches of the surface for 2 months in most years and within a depth of 10 to 40 inches for 8 months or more each year. In dry seasons, it recedes below a depth of 40 inches.

Immokalee soils are closely associated with Adamsville, Basinger, Cassia, Myakka, Ona, Placid, Pomello, Pompano, St. Lucie, and Tavares soils. Immokalee soils are distinguished from Adamsville soils by having a Bh horizon and by being more poorly drained. Immokalee soils have well developed spodic horizons, which Basinger soils lack. Immokalee soils differ from Cassia soils by being more poorly drained; by having a thicker, darker A1 horizon; and by having the spodic horizon below a depth of 30 inches. Immokalee soils are distinguished from Myakka soils by having an A horizon more than 30 inches thick. They differ from Ona soils by having an albic horizon and an A horizon more than 30 inches thick. Immokalee soils are better drained than Placid soils, lack an umbric epipedon, and have a spodic horizon. Immokalee soils are more poorly drained than Pomello soils and have a much darker A1 horizon. Immokalee soils differ from Pompano soils by having a spodic horizon. Immokalee soils are much wetter than St. Lucie and Tavares soils and have a spodic horizon.

Typical pedon of Immokalee fine sand, from a wooded area approximately 1/4 mile north of U.S. Highway 192 and 1 mile due east of Florida Highway 545 on Walt Disney world property (NE1/4SE1/4 sec. 2, T. 25 S., R. 27 E.):

- A1—0 to 7 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; gradual wavy boundary.
- A21—7 to 13 inches; light gray (10YR 6/1) fine sand; single grained; loose; many uncoated sand grains; few medium roots; very strongly acid; gradual wavy boundary.
- A22—13 to 37 inches; white (10YR 8/1) fine sand; few medium faint brown (10YR 5/3) mottles; single grained; loose; many uncoated sand grains; very strongly acid; abrupt smooth boundary.
- B21h—37 to 41 inches; black (10YR 2/1) fine sand; few fine faint very dark brown (10YR 2/2) and grayish brown (10YR 5/2) mottles; massive; weakly cemented; many dead roots; very strongly acid; gradual wavy boundary.
- B22h—41 to 47 inches; dark reddish brown (5YR 3/2) fine sand; few fine distinct reddish yellow (7.5YR 6/6) and black (10YR 2/1) mottles; massive; weakly cemented; few dead roots; very strongly acid; gradual wavy boundary.
- B3—47 to 65 inches; dark brown (7.5YR 4/2) fine sand; few fine distinct reddish yellow (5YR 6/8) and dark brown (7.5YR 3/2) mottles; single grained; loose; very strongly acid; gradual wavy boundary.
- C—65 to 80 inches; dark grayish brown (10YR 4/2) fine sand; few fine faint black and very dark brown mottles; single grained; loose; very strongly acid.

Solum thickness is 42 inches or more. Reaction ranges from very strongly acid to strongly acid throughout the profile.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1. Range in thickness is 6 to 8 inches.

The A2 horizon is 27 to 40 inches thick. It has hue of 10YR, value of 5 through 8, and chroma of 1 or 2. It has few to common mottles of gray and brown.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1; hue of 5YR, value of 2 or 3, and chroma of 1 through 3; hue of 7.5YR, value of 3, and chroma of 2; or hue of N and value of 2. It ranges in thickness from 9 to 19 inches and has mottles of very dark brown, grayish brown, reddish yellow, and black.

The B3 horizon ranges in thickness from 13 to 28 inches. It has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 through 4. It is mottled with reddish yellow and dark brown.

The C horizon, where present, extends to a depth of more than 80 inches. It has hue of 10YR, value of 4 through 7, and chroma of 2 through 4. Mottles of black, dark grayish brown, strong brown, and light gray occur in this horizon.

Kaliga series

The Kaliga series is a member of the loamy, mixed, dysic, hyperthermic family of Terric Medisaprists. It consists of very poorly drained soils that formed in moderately thick deposits of organic materials and in the underlying loamy and clayey mineral materials. These soils occur in low flats, swamps, and marshes. Slopes are less than 1 percent. The water table is at or above the surface except during extended dry periods.

Kaliga soils are closely associated with Basinger, Nitaw, Delray, Floridana, Hontoon, Riviera, Samsula, Placid, and Pompano soils. Kaliga soils are of organic origin, whereas Basinger, Nitaw, Delray, Floridana, Riviera, Placid, and Pompano soils are all of mineral origin. Kaliga soils have mineral horizons within a depth of 51 inches,

whereas Hontoon soils have organic horizons more than 51 inches thick. Kaliga soils differ from Samsula soils by having loamy mineral material within a depth of 51 inches, whereas the mineral horizons in Samsula soils are sandy to a depth of more than 51 inches.

Typical pedon of Kaliga muck from a slough area about 1,700 feet south of Florida Highway 525 and about 0.8 mile east of Florida Highway 525A (SW1/4NW1/4 sec. 28, T. 26 S., R. 30 E.):

Oap—0 to 7 inches; dark brown (7.5YR 3/2) unrubbed muck; black (5YR 2/1) rubbed; about 25 percent fiber unrubbed, 10 percent rubbed; moderate medium subangular blocky structure; friable; many fine roots; about 35 percent mineral material; sodium pyrophosphate extract color is very dark grayish brown (10YR 3/2); extremely acid; gradual wavy boundary.

Oa2—7 to 26 inches; black (5YR 2/1) unrubbed and rubbed muck; about 60 percent fiber unrubbed, 10 percent rubbed; weak coarse subangular blocky structure; slightly sticky; few fine roots; about 7 percent mineral material; sodium pyrophosphate extract color is very dark grayish brown (10YR 3/2); extremely acid; clear wavy boundary.

IIC1—26 to 32 inches; black (N 2/0) loam; moderate medium subangular blocky structure; friable; common fine roots; about 9 percent organic material; very strongly acid; clear wavy boundary.

IIC2—32 to 37 inches; very dark gray (10YR 3/1) loamy fine sand; many fine distinct light gray (10YR 7/1) streaks; weak fine subangular blocky structure; friable; few fine roots; strongly acid; abrupt smooth boundary.

IIIC3—37 to 53 inches; very dark gray (10YR 3/1) clay; common fine distinct brown (7.5YR 4/4) stains along root channels; massive; slightly sticky; few fine roots; strongly acid; gradual smooth boundary.

IIIC4—53 to 65 inches; very dark gray (10YR 3/1) sandy clay loam; common fine faint dark gray (10YR 4/1) mottles; massive; friable; few fine roots; medium acid; gradual wavy boundary.

IVC5—65 to 80 inches; grayish brown (10YR 5/2) loamy fine sand; common medium faint dark grayish brown (10YR 4/2) and few fine distinct white (10YR 8/1) mottles; massive; friable; medium acid.

Reaction of the Oa horizon is less than 4.5 in 0.01M calcium chloride. Thickness of the organic material ranges from 16 to 40 inches but is dominantly 25 to 33 inches. Weighted clay content of the upper 12 inches of the IIC horizon within the 51-inch control section is less than 35 percent. Reaction of the IIC, IIIC, and IVC horizons ranges from very strongly acid to slightly acid, and base saturation is more than 35 percent.

The Oa horizon has hue of 10YR, value of 2, and chroma of 1; hue of 7.5YR, value of 3, and chroma of 2; hue of 5YR, value of 2 or 3, and chroma of 1 through 3; or hue of N and value of 2. The fiber content, after rubbing, is less than 17 percent of the soil volume. Sodium pyrophosphate extract color is in hue of 10YR with value of 2 and chroma of 1 or 2, with value of 3 or 4 and chroma of 1 through 4, with value of 5 and chroma of 2 through 8, with value of 6 and chroma of 3 through 8, or with value of 7 and chroma of 4 through 8.

The IIC horizon has hue of 10YR, value of 2 through 4, and chroma of 1 or 2; hue of 2.5Y, value of 2 or 3, and chroma of 2; or hue of N and value of 2 or 3. Texture ranges from loam to loamy sand.

The IIIC horizon has hue of 10YR, value of 2 through 5, and chroma of 1 or 2; hue of 2.5Y, value of 2 through 5, and chroma of 2; or hue of N and value of 2 through 5. It has mottles of brown, gray, and yellow. Texture is sandy clay or clay in the upper part and sandy clay loam in the lower part.

The IVC horizon has color similar to that of the IIIC horizon. Texture ranges from loamy sand to fine sandy loam.

Lokosee series

The Lokosee series is a member of the loamy, siliceous, hyperthermic family of Grossarenic Ochraqualfs. It consists of nearly level, poorly drained soils that formed in thick, sandy and loamy marine sediments. These nearly level soils are on hammocks and ridges bordering drainageways and on broad flats within the flatwoods. Slopes range from 0 to 2 percent. The water table is within a depth of 10 inches for 2 to 4 months in most years and between depths of 10 and 40 inches for more than 6 months. During extended dry seasons, it recedes below a depth of 40 inches.

Lokosee soils are associated with EauGallie, Malabar, Pineda, Parkwood, Pomona, and Oldsmar soils. Lokosee soils differ from EauGallie, Oldsmar, and Pomona soils by having a Bir horizon. Additionally, Pomona soils have a Bt horizon with base saturation of less than 35 percent. Lokosee soils differ from Malabar and Pineda soils by having a B'hir horizon above the Bt horizon. Additionally, depth to the Bt horizon is less than 40 inches in Pineda soils. Lokosee soils differ from Parkwood soils by having a Bir horizon and by lacking a B2tca horizon.

Typical pedon of Lokosee fine sand, from an area of range 2 miles southeast of the point where canal C-36 enters Lake Hatchineha (SE1/4NE1/4 sec. 28, T. 28 S., R. 30 E.):

A1—0 to 4 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; common medium and fine roots; many uncoated white sand grains; strongly acid; clear smooth boundary.

A21—4 to 7 inches; light gray (10YR 6/1) fine sand; single grained; loose; few fine roots; slightly acid; clear smooth boundary.

A22—7 to 27 inches; white (10YR 8/1) fine sand; lower 10 inches of horizon has common coarse distinct dark brown (7.5YR 4/4), dark yellowish brown (10YR 5/4), and pale brown (10YR 6/3) mottles; single grained; loose; few medium root channels stained with very dark gray (10YR 3/1); neutral; gradual smooth boundary.

B1ir—27 to 30 inches; very pale brown (10YR 7/4) fine sand; common medium distinct brownish yellow (10YR 6/6, 10YR 6/8) mottles; single grained; loose; medium acid; gradual smooth boundary.

B2ir—30 to 35 inches; yellow (10YR 7/6) fine sand; common medium distinct brownish yellow (10YR 6/6, 10YR 6/8) mottles; single grained; loose; medium acid; gradual wavy boundary.

B'hir—35 to 43 inches; very dark grayish brown (10YR 3/2) and dark brown (10YR 4/3) fine sand; common medium distinct yellowish red (5YR 4/6) and dark yellowish brown (10YR 4/4) mottles; single grained; loose; common weakly cemented very dark gray (5YR 3/1) spodic fragments 1 to 2 inches in diameter; medium acid; gradual wavy boundary.

A2—43 to 49 inches; light gray (10YR 7/1) fine sand; common medium faint gray (10Y 5/1) and grayish brown (10YR 5/2) mottles; single grained; loose; very strongly acid; abrupt wavy boundary.

B2tg—49 to 57 inches; gray (5Y 5/1) sandy clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate coarse subangular blocky structure; firm; common root channels stained with yellowish brown (10YR 5/6); sand grains bridged with clay; very strongly acid.

Solum thickness ranges from 45 to 80 inches. Reaction ranges from very strongly acid to neutral in the A horizon, from medium acid to moderately alkaline in the Bir horizon, and from very strongly acid to moderately alkaline in the Btg horizon.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3, or hue of N and value of 2 or 3. Where value is 3 or less, the A1 horizon is less than 6 inches thick. Texture is sand or fine sand.

The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 through 3.

The Bir horizon has hue of 10YR, value of 5 through 8, and chroma of 4 through 8; hue of 7.5YR, value of 5 or 6, and chroma of 4 through 6; or hue of 5YR, value of 4, and chroma of 6. Mottles in shades of brown, yellow, and red are in this horizon. Texture is sand or fine sand.

The B^hir horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4, or hue of 7.5YR, value of 4, and chroma of 2 through 4. In some pedons this horizon contains mottles of black, or it contains mottles in shades of brown and yellow and bodies of weakly cemented black, very dark gray, or dark reddish brown fine sand. Texture is sand or fine sand.

The A² horizon has hue of 10YR, value of 5 through 7, and chroma of 1 through 3. It has mottles in shades of gray and brown. Texture is sand or fine sand. Combined thickness of the horizons above the B²tg horizon ranges from 40 to 60 inches.

The B²tg horizon has hue of 10YR, value of 4 through 6, and chroma of 1 or 2; hue of 5Y, value of 4 through 6, and chroma of 1 through 3; or hue of 5GY, value of 6, and chroma of 1. It has mottles in shades of gray, brown, yellow, and green. Texture is sandy loam, fine sandy loam, or sandy clay loam. In some pedons this horizon has few fine to coarse streaks and pockets of coarser material.

Some pedons have a Cg horizon. Where present, the Cg horizon has hue of 10YR, value of 4 through 8, and chroma of 1 or 2, or hue of 5Y, value of 6, and chroma of 1. Texture is sand, fine sand, or loamy fine sand.

Malabar series

The Malabar series is a member of the loamy, siliceous, hyperthermic family of Grossarenic Ochraqualfs. It consists of nearly level, poorly drained soils that formed in thick beds of sandy and loamy marine sediments. These soils occur in broad sloughs and in depressions in the flatwoods. Slopes range from 0 to 2 percent. The water table is within a depth of 10 inches for 2 to 6 months during most years. Depressions are covered with standing water for 6 to 12 months in most years.

Malabar soils are associated with Basinger, Holopaw, Immokalee, Myakka, Pineda, Pompano, Winder, and Vero soils. Malabar soils are distinguished from Basinger soils by having Bir and B²tg horizons within a depth of 80 inches. Malabar soils differ from Holopaw soils by having a Bir horizon. Malabar soils are distinguished from Immokalee and Myakka soils by lacking a spodic horizon and by having Bir and B²tg horizons within a depth of 80 inches. Malabar soils differ from Pineda soils by having the B²tg horizon below a depth of 40 inches. Malabar soils are distinguished from Pompano soils by having a Bir horizon and a B²tg horizon at a depth of less than 80 inches and from Vero soils by lacking a Bh horizon. Malabar soils differ from Winder soils by having a Bir horizon and by being deeper to the Btg horizon.

Typical pedon of Malabar fine sand, in a grassy slough approximately 100 yards southwest of Florida Highway 523 on Three Lakes Wildlife Management Area (NE1/4SE1/4 sec. 18, T. 29 S., R. 32 E.):

- A1—0 to 4 inches; black (10YR 2/1) fine sand; weak fine granular structure; friable; slightly acid; gradual smooth boundary.
- A21—4 to 10 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; slightly acid; gradual wavy boundary.
- A22—10 to 18 inches; very pale brown (10YR 7/3) fine sand; few fine faint yellowish brown (10YR 5/4) mottles; single grained; loose; slightly acid; gradual wavy boundary.

Blir—18 to 22 inches; light yellowish brown (10YR 6/4) fine sand; common medium distinct yellow (10YR 7/6) mottles; single grained; loose; slightly acid; gradual smooth boundary.

B21r—22 to 28 inches; reddish yellow (7.5YR 6/6) fine sand; few fine faint light brownish gray (10YR 6/2) mottles; single grained; loose; slightly acid; gradual wavy boundary.

B22ir—28 to 38 inches; yellowish brown (10YR 5/4) fine sand; few fine faint strong brown (7.5YR 5/6) mottles; single grained; loose; slightly acid; gradual wavy boundary.

A²—38 to 50 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; neutral; abrupt wavy boundary.

B²tg—50 to 68 inches; olive gray (5Y 5/2) sandy clay loam; few fine faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; moderately alkaline; gradual wavy boundary.

B³g—68 to 80 inches; olive gray (5YR 2/2) sandy loam; few fine faint light brownish gray (10YR 6/2) mottles; massive; friable; common medium pockets of sand and sandy clay loam; moderately alkaline.

Thickness of the solum ranges from 46 to 80 inches. Soil reaction ranges from medium acid to neutral in the A and Bir horizons and from neutral to moderately alkaline in the B²tg horizon.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1. It ranges in thickness from 4 to 8 inches.

The A2 horizon has hue of 10YR with value of 5 or 6 and chroma of 2 or 3 or with value of 7 or 8 and chroma of 3 or 4; or it has hue of 2.5Y, value of 5 or 6, and chroma of 2. It ranges in thickness from 10 to 18 inches and has mottles of brown and yellow. Texture is fine sand or sand.

The Bir horizon has hue of 10YR, value of 5 through 7, and chroma of 4 through 8, or hue of 7.5YR, value of 5, and chroma of 6 or 8. It ranges in thickness from 14 to 30 inches and has mottles in shades of gray, brown, and yellow. Texture is fine sand or sand.

The A² horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. It ranges in thickness from 10 to 12 inches and has mottles of gray, brown, and yellow. Texture is fine sand or sand.

The B²tg horizon has hue of 10YR or 5Y, value of 4 through 7, and chroma of 1 or 2. It ranges in thickness from 10 to 18 inches and has mottles of olive, gray, brown, and yellow. Texture is sandy loam or sandy clay loam.

The B³g horizon has hue of 5Y or 10YR, value of 4 through 6, and chroma of 1 or 2. Not all pedons contain this horizon. Where present, the B³g horizon ranges in thickness from 9 to 27 inches. Texture is sandy loam or sandy clay loam.

Some pedons have a Cg horizon. Where present, the Cg horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Texture ranges from sand to fine sandy loam, but is most commonly lenses and pockets of these textures.

Myakka series

The Myakka series is a member of the sandy, siliceous, hyperthermic family of Aeric Haplaquods. It consists of nearly level, poorly drained, sandy soils formed in thick marine deposits of sandy material. These soils occur in broad areas in the flatwoods. Slopes range from 0 to 2 percent. The water table is at a depth of less than 10 inches for 1 to 4 months in most years and recedes below a depth of 40 inches during extended dry seasons.

Myakka soils are associated with Cassia, EauGallie, Immokalee, Oldsmar, Ona, Pomella, Vero, and Wauchula soils. Myakka soils are more poorly drained than Cassia soils and have a thicker, darker A1 horizon. Myakka soils are distinguished from EauGallie soils by lacking a Bt horizon beneath the Bh horizon. Myakka soils differ from Immokalee soils in that depth to the Bh horizon is less than 30 inches. Myakka soils are distinguished from Old-

smar soils by having the Bh horizon at a depth of less than 30 inches and by lacking a Bt horizon. Myakka soils differ from Ona soils by having an A2 horizon. Myakka soils are much wetter than Pomello soils and have a darker A1 horizon and a Bh horizon within a depth of 30 inches. Myakka soils are distinguished from Vero and Wauchula soils by lacking a Bt horizon.

Typical pedon of Myakka fine sand, from an area of range approximately 4 miles west of Holopaw and 25 feet south of U.S. Highway 441 (SW1/4NE1/4 sec. 32, T. 26 S., R. 32 E.):

- A1—0 to 7 inches; very dark gray (10YR 3/1) fine sand; weak medium granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.
- A2—7 to 27 inches; light gray (10YR 7/1) fine sand; common medium distinct very dark grayish brown (10YR 3/2) and brown (7.5YR 4/2) streaks along root channels; single grained; loose; common fine and medium roots; very strongly acid; abrupt irregular boundary.
- B21h—27 to 33 inches; black (10YR 2/1) fine sand; massive in place, parts to moderate medium subangular blocky structure; firm, weakly cemented; many fine and medium roots; sand grains coated with colloidal organic matter; common fine distinct pockets of light gray uncoated sand grains; extremely acid; clear wavy boundary.
- B22h—33 to 37 inches; dark reddish brown (5YR 3/3) and very dark gray (5YR 3/1) fine sand; massive in place, parts to moderate medium subangular blocky structure; firm, weakly cemented; common medium and fine roots; sand grains coated with colloidal organic matter; extremely acid; clear wavy boundary.
- B3—37 to 43 inches; dark yellowish brown (10YR 4/4) fine sand; few medium distinct dark reddish brown (5YR 3/2) stains along root channels; single grained; loose; very strongly acid; clear wavy boundary.
- A'2—43 to 70 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common medium and fine roots in upper 10 inches; very strongly acid; clear smooth boundary.
- B'23h—70 to 82 inches; dark reddish brown (5YR 3/2) fine sand; massive in place, parts to weak fine subangular blocky structure; very friable; sand grains coated and very weakly cemented with colloidal organic material; very strongly acid.

Reaction ranges from extremely acid to strongly acid throughout. Thickness of the A horizon is less than 30 inches. Combined thickness of the upper sequence of A and Bh horizons is more than 40 inches.

The A1 horizon has hue of 10YR, value of 2 or 4, and chroma of 1, or hue of N and value of 2 to 4. Thickness ranges from 5 to 7 inches.

The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 2 or less, or hue of N and value of 5 to 7. Few to common gray or brown mottles are in this horizon. Thickness ranges from 13 to 21 inches.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1; hue of 5YR, value of 2 or 3, and chroma of 3 or less; hue of 7.5YR, value of 3, and chroma of 2; or hue of N and value of 2. Thickness ranges from 6 to 17 inches, and texture ranges from sand to loamy fine sand. Some pedons contain fine to medium pockets of gray, uncoated sand grains.

The B3 horizon is in hue of 10YR, value of 3 through 5, and chroma of 3 or 4, or hue of 7.5YR, value of 4 or 5, and chroma of 4. Thickness ranges from 5 to 19 inches.

Some pedons have a B3&Bh horizon. Where this horizon is present, color is like that of the B3 horizon. There are common to many weakly cemented fragments of Bh horizon material.

The A'2 horizon has hue of 10YR, value of 4 through 7, and chroma of 2 through 4. Some pedons have brown and gray mottles. Thickness ranges from 5 to 27 inches.

The B'h horizon has color similar to that of the Bh horizon and is generally friable and noncemented. Thickness ranges from 10 to 18 inches, and this horizon extends to a depth of more than 80 inches in many pedons.

Some pedons lack A'2 and B'h horizons, and a C horizon underlies the Bh horizon. Where present, the C horizon has hue of 10YR, value of 5

through 7, and chroma of 1 through 3; hue of 7.5YR, value of 5 or 6, and chroma of 2; or hue of N and value of 5 or 6. Some pedons have mottles of gray or brown.

Narcoossee series

The Narcoossee series is a member of the sandy, siliceous, hyperthermic family of Entic Haplohumods. It consists of nearly level, somewhat poorly drained soils that formed in thick sandy marine sediments. These soils occur on low ridges and knolls in the flatwoods. Slopes range from 0 to 2 percent. The water table is within a depth of 20 to 40 inches for 4 to 6 months in most years. It recedes below a depth of 60 inches in extended dry seasons.

Narcoossee soils are closely associated with Adamsville, Myakka, Smyrna, and Tavares soils. Narcoossee soils have a discontinuous Bh horizon, whereas Adamsville and Tavares soils lack a Bh horizon. Myakka and Smyrna soils are poorly drained and have a well developed, continuous spodic horizon.

Typical pedon of Narcoossee fine sand, from a wooded area about 1.2 miles west of the intersection of Florida Highways 525 and 525A and 500 feet north of Florida Highway 525 (SE1/4SW1/4 sec. 19, T. 26 S., R. 30 E.):

- A1—0 to 5 inches; very dark gray (10YR 3/1) fine sand; moderate, medium, granular structure; very friable; common fine and few medium and coarse roots; very strongly acid; gradual smooth boundary.
- A21—5 to 9 inches; gray (10YR 5/1) fine sand; single grained; loose; few fine, medium, and coarse roots; very strongly acid; gradual smooth boundary.
- A22—9 to 22 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine roots; extremely acid; abrupt wavy boundary.
- B21h—22 to 24 inches; dark reddish brown (5YR 3/2) and dark brown (7.5YR 3/2) fine sand; moderate fine and medium subangular blocky structure; friable; sand grains coated with organic matter; horizon is discontinuous in about 40 percent of pedon; extremely acid; clear wavy boundary.
- B22h—24 to 26 inches; dark reddish brown (5YR 3/4) fine sand; weak fine and medium subangular blocky structure; friable; sand grains coated with organic matter; extremely acid; gradual wavy boundary.
- B3—26 to 36 inches; yellowish brown (10YR 5/4) fine sand; few medium faint dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; single grained; loose; very strongly acid; gradual smooth boundary.
- C1—36 to 62 inches; light gray (10YR 7/1) fine sand; common fine distinct yellowish brown (10YR 5/6) and dark brown (10YR 4/3) mottles and common coarse distinct brown (10YR 5/3) mottles; single grained; loose; very strongly acid; gradual smooth boundary.
- C2—62 to 82 inches; pale brown (10YR 6/3) fine sand; single grained; loose; very strongly acid.

Combined thickness of the A and Bh horizons ranges from 12 to 28 inches. Reaction ranges from extremely acid to medium acid in all horizons.

The A1 or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The A2 horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. Total thickness of the A horizon is 9 to 25 inches.

The B21h horizon has hue of 10YR, value of 2, and chroma of 1; hue of 7.5YR, value of 3, and chroma of 2; or hue of 5YR, value of 3, and chroma of 2 or 3. The B22h horizon has hue of 7.5YR, value of 3 or 4, and chroma of 2 through 4, or hue of 5YR, value of 3, and chroma of 3 or 4. Texture is sand or fine sand. The Bh horizon is 3 to 5 inches thick and is discontinuous. It ranges from 50 to 85 percent continuous in most pedons.

The B3 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4; hue of 7.5YR, value of 4, and chroma of 4; or hue of 5YR, value of 4, and chroma of 6. In some pedons, this horizon has few or common fine or medium mottles in shades of gray, brown, and yellow. Some pedons also have pockets of dark gray or gray fine sand in this horizon. The pockets are 2 to 5 millimeters in diameter. Texture is sand or fine sand.

The C1 horizon has hue of 10YR, value of 6 through 8, and chroma of 1 through 4. There are few or common fine to coarse mottles in shades of gray, brown, and yellow.

The C2 horizon has hue of 10YR, value of 6 through 8, and chroma of 2 through 3. It has few to many fine or medium mottles in shades of gray, brown, and yellow.

Some pedons have a C3 horizon. Where present, the C3 horizon has hue of 10YR, value of 4 through 8, and chroma of 1 through 4. It has few or common medium mottles in shades of gray, brown, and yellow. Texture is sand or fine sand.

Nittaw series

The Nittaw series is a member of the fine, montmorillonitic, hyperthermic family of Typic Argiaquolls. It consists of nearly level, very poorly drained, slowly permeable soils that formed in thick deposits of clayey sediments of marine origin. These soils occur in well defined drainageways and in broad swamps and marshes. Slopes are less than 1 percent in most places, but they range from 0 to 2 percent. The water table is at or above the surface for 6 to 8 months in most years. Most areas are flooded during summer.

Nittaw soils are associated with Gentry, Delray, Floridana, Hontoon, Samsula, Kaliga, and Winder soils. Nittaw soils have a histic epipedon and a clayey argillic horizon, which are lacking in Gentry, Delray, Floridana, and Winder soils. Nittaw soils are mineral, whereas Hontoon, Samsula, and Kaliga soils are organic.

Typical pedon of Nittaw muck, from a wooded swamp about 0.75 mile south of U.S. Highway 192 and 0.75 mile east of Crabgrass Road (SE1/4SE1/4 sec. 22, T. 27 S., R. 33 E.):

Oa—7 inches to 0; dark reddish brown (5YR 2/2) muck, black (5YR 2/1) rubbed; 50 percent fiber, 7 percent rubbed; weak medium granular structure; friable; many fine and medium roots; few uncoated white sand grains; mineral content 10 percent; sodium pyrophosphate extract light yellowish brown (10YR 6/4); extremely acid; abrupt smooth boundary.

A1—0 to 8 inches; black (10YR 2/1) fine sand; weak medium granular structure; friable; many fine and medium and few large roots; few uncoated white sand grains; medium acid; clear smooth boundary.

B2ltg—8 to 21 inches; very dark gray (10YR 3/1) sandy clay; massive; crushes to moderate medium blocky structure; sticky; few fine roots; medium acid; gradual smooth boundary.

B22tg—21 to 45 inches; dark gray (5YR 4/1) sandy clay; few fine faint olive gray (5YR 4/2) and few fine distinct olive (5YR 5/4, 5YR 5/6) mottles; massive, crushes to moderate medium blocky structure; very sticky; neutral; gradual smooth boundary.

B23tg—45 to 64 inches; gray (5YR 5/1) sandy clay; few fine faint olive gray (5YR 5/2) mottles; massive, crushes to moderate medium sub-angular blocky structure; slightly sticky; few to common fine to coarse pockets of light gray (10YR 7/1) fine sand; neutral; clear smooth boundary.

Cg—64 to 76 inches; light gray (5YR 6/1) fine sand; single grained; loose; many uncoated sand grains; neutral.

Solum thickness is 50 inches or more. The Oa horizon is extremely acid; the A and B2ltg horizons range from medium acid to neutral; and the B22tg, B23tg, and Cg horizons range from neutral to moderately alkaline.

The Oa horizon has hue of 10YR, value of 2, and chroma of 1 or 2; hue of 5YR, value of 2 or 3, and chroma of 1 through 3; or hue of N and value of 2 or 3. Thickness is 6 to 14 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1; hue of 2.5, value of 3, and chroma of 2; or hue of N and value of 2 or 3. Texture is sand, fine sand, or mucky fine sand.

The B2ltg horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; hue of 2.5Y, value of 3, and chroma of 2; or hue of N and value of 2 or 3. Combined thickness of the A and B2ltg horizons ranges from 10 to 24 inches.

The B22tg and B23tg horizons have hue of 10YR, 2.5YR, and 5Y, value of 4 through 6, and chroma of 1 or 2, or hue of N and value of 4 through 6. Few to many fine to coarse mottles of gray, brown, olive, and yellow are in this horizon in some pedons. Some pedons have few medium or coarse pockets of grayish brown, gray, or light gray sand, fine sand, loamy sand, or loamy fine sand in the B22tg and B23tg horizons. Few to many fine to coarse mottles and pockets of light gray and white carbonatic material also occur in these horizons in some pedons. Texture of the B2tg horizon is sandy clay or clay. In some pedons, the B2tg horizon extends to a depth of more than 80 inches.

The Cg horizon has hue of 10YR or 5Y, value of 5 through 8, and chroma of 1 or 2; hue of 2.5Y, value of 5 through 7, and chroma of 2; hue of N and value of 5 through 7; or hue of 5GY, value of 4 through 6, and chroma of 1. Texture ranges from sand to fine sandy loam.

Oldsmar series

The Oldsmar series is a member of the sandy, siliceous, hyperthermic family of Alfic Arenic Haplaquods. It consists of nearly level, poorly drained, sandy soils. These soils formed in thick beds of marine sands over loamy materials and occur in broad areas in the flatwoods between swamps and sloughs and in low areas in the sand hills. The water table is at a depth of less than 10 inches for 1 to 3 months during wet seasons in most years. It is within a depth of 10 to 40 inches for periods of 6 months or more in most years and recedes below a depth of 40 inches in dry seasons. Slopes range from 0 to 2 percent.

Oldsmar soils are associated with EauGallie, Immokalee, Myakka, Pompano, Smyrna, Ona, Riviera, Vero, and Wauchula soils. Oldsmar soils differ from EauGallie, Myakka, Smyrna, Ona, and Vero soils by having the Bh horizon below a depth of 30 inches. Immokalee and Pompano soils differ from Oldsmar soils by lacking a B'tg horizon. Oldsmar soils are distinguished from Riviera soils by having a Bh horizon. Oldsmar soils have a higher base saturation in the B'tg horizon and greater depth to the Bh horizon than Wauchula soils.

Typical pedon of Oldsmar fine sand, from a wooded hammock about 2,000 feet south of Southport Park on Lake Tohopekaliga (NE1/4SW1/4 sec. 13, T. 27 S., R. 29 E.):

A1—0 to 6 inches; black (10YR 2/1) fine sand; weak medium granular structure; very friable; many fine, medium, and coarse roots; many uncoated white sand grains; extremely acid; gradual smooth boundary.

A2l—6 to 11 inches; gray (10YR 5/1) fine sand; common coarse dark gray (10YR 4/1) mottles; single grained; loose; few fine and medium roots; extremely acid; gradual smooth boundary.

A22—11 to 43 inches; light gray (10YR 7/1) fine sand; common medium and coarse very dark gray (10YR 3/1), dark gray (10YR 4/1), dark grayish brown (10YR 4/2), and gray (10YR 5/1) mottles; reddish brown (5YR 4/4) and brownish yellow (10YR 6/6) stains along root channels; single grained; loose; lower 2 inches has horizontal streaks of dark yellowish brown (10YR 4/4) and dark brown (7.5YR 4/4); medium acid; clear wavy boundary.

B21h—43 to 48 inches; black (10YR 2/1) loamy fine sand; common medium faint very dark gray (10YR 3/1) and few medium distinct dark gray (10YR 4/1) mottles; massive in place, parts to weak medium subangular blocky structure; friable; compact; few fine roots; strongly acid; gradual smooth boundary.

B22h—48 to 54 inches; black (5YR 2/1) loamy fine sand; common coarse dark reddish brown (5YR 2/2, 5YR 3/2, 5YR 3/3) and few medium dark brown (10YR 3/3) mottles; massive in place, parts to moderate medium subangular blocky structure; firm, compact; strongly acid; clear irregular boundary.

B3&Bh—54 to 63 inches; dark grayish brown (10YR 4/2) loamy fine sand; few fine very dark grayish brown (10YR 3/2) mottles and many black (10YR 2/1) compact fragments; single grained; loose; strongly acid; gradual irregular boundary.

A'2—63 to 67 inches; light brownish gray (10YR 6/2) fine sand; few coarse distinct grayish brown (10YR 5/2) and gray (10YR 6/1) mottles; single grained; loose; medium acid; abrupt wavy boundary.

B'21tg—67 to 77 inches; dark gray (10YR 4/1) sandy clay loam; common medium distinct very dark gray (10YR 3/1) and dark grayish brown (10YR 4/2) mottles and few medium distinct gray (5YR 5/1) mottles; massive in place, parts to weak medium subangular blocky structure; friable, slightly sticky; few medium dead roots; sand grains bridged with clay; strongly acid; gradual smooth boundary.

B'22tg—77 to 80 inches; greenish gray (5GY 6/1) sandy clay loam; few medium dark gray (5Y 4/1) and gray (5Y 5/1) mottles; massive in place, parts to weak coarse subangular blocky structure; firm; sand grains bridged with clay; medium acid.

Soil reaction ranges from extremely acid to slightly acid in the A horizon, from strongly acid to slightly acid in the B2h horizon, and from medium acid to mildly alkaline in the B'2tg horizon. Solum thickness exceeds 45 inches.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1 or 2. Thickness ranges from 4 to 7 inches.

The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2; hue of 2.5Y, value of 7 or 8, and chroma of 2; or hue of N and value of 5 or 6. Thickness ranges from 24 to 37 inches.

The B2h horizon has hue of 10YR, value of 2, and chroma of 1, or hue of 5YR, value of 2 or 3, and chroma of 1 or 2. It is 5 to 15 inches thick.

The B'2tg horizon has hue of 10YR, 2.5Y, or 5GY, value of 4 through 6, and chroma of 1 or 2. This horizon is sandy loam or sandy clay loam. Depth to the B'2tg horizon ranges from 42 to 80 inches.

Some pedons have an A'2 or B3&Bh horizon between the B2h horizon and the B'2tg horizon. Where present, the A'2 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. This horizon ranges from 0 to 7 inches in thickness. The B3&Bh horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Weakly cemented black and very dark brown Bh fragments occur throughout this horizon.

Ona series

The Ona series is a member of the sandy, siliceous, hyperthermic family of Typic Haplaquods. It consists of nearly level, poorly drained soils formed in sandy marine sediments. These soils have a spodic horizon immediately below the A1 horizon. Ona soils occur in broad, flat areas in the flatwoods between swamps and marshes or as long, narrow bands bordering depressions and drainageways. Slopes are less than 2 percent. The water table is within 10 inches of the surface for 1 to 2 months and between depths of 10 and 40 inches for 4 to 6 months in most

years. In dry periods it recedes below a depth of 40 inches.

Ona soils are associated with Basinger, EauGallie, Im-mokalee, Myakka, Placid, Pomello, Smyrna, and Vero soils. Ona soils have a spodic horizon, which Basinger soils lack. Ona soils are distinguished from EauGallie, Im-mokalee, Myakka, Pomello, Smyrna, and Vero soils by lacking an A2 horizon. Ona soils differ from Placid soils by having a Bh horizon.

Typical pedon of Ona fine sand, in a pasture 150 feet northeast from dirt road, 0.73 mile south of Live Oak Lake, and 0.78 mile east of Florida Highway 534, 2 miles southeast of St. Cloud (NW1/4NE1/4 sec. 20, T. 26 S., R. 31 E.):

Ap—0 to 6 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; many medium and fine roots; very strongly acid; abrupt wavy boundary.

B21h—6 to 10 inches; dark reddish brown (5YR 3/2) fine sand; weakly cemented with organic matter; moderate medium granular structure; friable; many medium and fine roots; very strongly acid; clear wavy boundary.

B22h—10 to 15 inches; dark reddish brown (5YR 2/2) fine sand; weak fine granular structure; friable; many medium and fine roots; very strongly acid; gradual wavy boundary.

B3—15 to 18 inches; dark brown (10YR 4/3) fine sand; common medium faint brown (10YR 5/3, 7.5YR 5/2) and pale brown (10YR 6/3) mottles and few medium faint very dark grayish brown (10YR 3/2) mottles; weak fine granular structure; friable; many medium and fine roots; very strongly acid; gradual wavy boundary.

C1—18 to 27 inches; pale brown (10YR 6/3) fine sand; common medium faint brown (7.5YR 4/4, 10YR 5/3), dark brown (10YR 4/3), and light gray (10YR 7/2) mottles and few fine distinct brownish yellow (7.5YR 6/6) mottles; single grained; loose; very strongly acid; diffuse wavy boundary.

C2—27 to 42 inches; gray (10YR 6/1) fine sand; few fine distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) mottles and common fine faint gray (10YR 5/1) and light gray (10YR 7/1) mottles; single grained; loose; very strongly acid; clear wavy boundary.

C3—42 to 80 inches; grayish brown (10YR 5/2) fine sand; few fine faint brownish yellow (10YR 6/8) and light gray (10YR 7/2) mottles; single grained; loose; very strongly acid.

Reaction ranges from medium acid to very strongly acid in the A and C horizons and is very strongly acid or strongly acid in the B horizon.

The Ap or A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. This horizon ranges from 5 to 8 inches in thickness.

The B2h horizon ranges from 9 to 16 inches in thickness. This horizon has hue of 10YR, value of 2, and chroma of 1; hue of 5YR, value of 2 or 3, and chroma of 3 or less; or hue of 7.5YR, value of 3, and chroma of 2. It has mottles of brown and gray.

The B3 horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 1 through 3. Mottles are gray, brown, and yellow. This horizon ranges from 3 to 14 inches in thickness.

The C horizon has hue of 10YR, value of 4 through 7, and chroma of 4 or less. Some pedons have mottles of brown, gray, red, and yellow.

Paola series

The Paola series is a member of the uncoated, hyperthermic family of Spodic Quartzipsamments. It consists of nearly level to gently sloping, excessively drained, sandy soils on ridgetops and side slopes in the sandhills and on low ridges and knolls in the flatwoods. These soils formed in thick deposits of marine sands. Slopes range

from 0 to 5 percent. The water table is below a depth of 72 inches throughout the year.

Paola soils are associated with Candler, Immokalee, Myakka, Pomello, St. Lucie, and Tavares soils. Paola soils are distinguished from Candler and Tavares soils by having a thick albic horizon and by lacking lamellae, which Candler soils have. Additionally, they are better drained than Tavares soils. Paola soils differ from Immokalee, Myakka, and Pomello soils by being better drained and by lacking a spodic horizon. They differ from St. Lucie soils by having a B&A horizon.

Typical pedon of Paola sand, 0 to 5 percent slopes, 0.75 mile south of U.S. Highway 192 and 0.5 mile east of Interstate Highway 4 (SW1/4NW1/4 sec. 18, T. 25 S., R. 28 E.):

- A1—0 to 3 inches; dark gray (10YR 4/1) sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; gradual wavy boundary.
- A21—3 to 6 inches; light gray (10YR 7/1) sand; few reddish yellow (7.5YR 7/6) krotovinas; single grained; loose; very strongly acid; clear irregular boundary.
- A22—6 to 16 inches; white (10YR 8/1) sand; single grained; loose; few fine and medium roots; very strongly acid; abrupt irregular boundary.
- B&A22—16 to 43 inches; yellow (10YR 7/8) sand; single grained; loose; few tongues, 1/2 inch to 4 inches wide and 2 to 10 inches long, of white sand from A2 horizon project into this horizon; outer 1/4 to 1/2 inch of tongues and thin contact layer between A2 and B&A horizons are stained with dark brown (7.5YR 4/3) organic material that in places is weakly cemented; contact layer also contains few weakly cemented spheroidal concretions, 1/2 inch to 2 inches in diameter, which are strong brown (7.5YR 5/6) at the periphery and dark brown (10YR 3/2) at the center; many large and fine roots; strongly acid; gradual smooth boundary.
- B—43 to 80 inches; reddish yellow (7.5YR 6/6) sand; single grained; loose; strongly acid.

Reaction is very strongly acid or strongly acid in all horizons. Depth of the sand exceeds 80 inches.

The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 1. Thickness ranges from 2 to 5 inches.

The A2 horizon has hue of 10YR, value of 7 or 8, and chroma of 1. It ranges in thickness from 8 to 17 inches.

The B part of the B&A horizon has hue of 10YR or 7.5YR, value of 6 or 7, and chroma of 4 through 8. Tongues of light gray or white sand and weakly cemented organic concretions occur throughout. The B horizon as described is not present in all pedons. Where present, it has color similar to that of the B part of the B&A horizon.

The C horizon, where present, has hue of 10YR, value of 5 through 8, and chroma of 3 or 4.

Parkwood series

The Parkwood series is a member of the coarse-loamy, mixed, hyperthermic family of Mollic Ochraqualfs. It consists of nearly level, poorly drained, calcareous soils formed in thick beds of sandy and loamy marine sediments. These soils occur as long, narrow and circular hammock areas bordering sloughs, depressions, and streams in the flatwoods. Slopes range from 0 to 2 percent. During wet seasons, the water table is within 10 inches of the surface for 2 to 4 months.

Parkwood soils are associated with EauGallie, Holopaw, Pineda, Pompano, Riviera, Vero, Wauchula, and Winder

soils. Parkwood soils differ from EauGallie, Vero, and Wauchula soils by lacking a spodic horizon. Parkwood soils are distinguished from Holopaw soils by having a Btca horizon at a depth of less than 20 inches. Parkwood soils are different from Pineda soils in lacking a Bir horizon. Parkwood soils are distinguished from Pompano soils by having a Btca horizon. Parkwood soils are distinguished from Riviera and Winder soils by lacking glossic properties and an A2 horizon.

Typical pedon of Parkwood loamy fine sand, from a cabbage palm hammock about 4.5 miles north of Six-Mile Road and 1.25 miles west of the Brevard County line (NW1/4SE1/4NE1/4 sec. 2, T. 30 S., R. 34 E.):

- A11—0 to 5 inches; very dark grayish brown (10YR 3/2) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots and few large roots; neutral; gradual wavy boundary.
- A12—5 to 7 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; many fine, medium, and large roots; mildly alkaline; calcareous; clear wavy boundary.
- B21tca—7 to 21 inches; gray (10YR 5/1) fine sandy loam; moderate medium granular structure; friable; common medium and fine roots; few medium to large white (N 8/0) carbonate concretions; moderately alkaline; calcareous; gradual wavy boundary.
- B22tca—21 to 35 inches; light brownish gray (10YR 6/2) fine sandy loam; weak medium granular structure; friable; few medium light gray (10YR 6/1) carbonate concretions; moderately alkaline; calcareous; gradual wavy boundary.
- B3ca—35 to 56 inches; light brownish gray (10YR 6/2) loamy fine sand; weak fine granular structure; friable; few small light gray carbonate concretions; moderately alkaline; calcareous; gradual wavy boundary.
- Cg—56 to 70 inches; light gray (10YR 7/2) loamy fine sand; massive; friable; few small light gray carbonate concretions; moderately alkaline; calcareous.

Soil reaction is neutral to mildly alkaline in the A horizon and mildly alkaline or moderately alkaline in the B2tca and Cg horizons.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; hue of 2.5Y, value of 3, and chroma of 2; or hue of N and value of 2 or 3. This horizon ranges in thickness from 7 to 10 inches.

In some pedons there is a thin transitional layer between the A1 and B21tca horizons. Where present, this layer has hue of 10YR, value of 4, and chroma of 2 or less, or hue of N and value of 4. It is 0 to 2 inches thick. Texture is fine sand or loamy fine sand.

The B2tca horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. It has mottles of brown and yellow. Gray and white carbonate concretions occur throughout this horizon.

The B3ca horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Mottles of gray, brown, and yellow, and carbonate concretions of gray and white occur throughout this horizon. The B3ca horizon is 12 to 25 inches thick.

The Cg horizon has hue of 10YR or 5Y, value of 6 or 7, and chroma of 1 or 2. It has mottles of gray and brown. Texture is fine sand or loamy fine sand. This horizon extends to a depth of more than 80 inches.

Pineda series

The Pineda series is a member of the loamy, siliceous, hyperthermic family of Arenic Glossaqualfs. It consists of nearly level, poorly drained soils. These soils formed in thick beds of sandy and loamy marine sediments. The nearly level soils occur in broad sloughs and low hammocks. The water table is within a depth of 10 inches for 1 to 6 months during most years. Slopes are less than 2 percent.

Pineda soils are associated with Delray, Floridana, Holopaw, Malabar, Riviera, Vero, and Winder soils. Pineda soils differ from Delray and Floridana soils by having a Bir horizon and by lacking a mollic epipedon. Additionally Delray soils have a Bt horizon below a depth of 40 inches. Pineda soils differ from Holopaw soils by having a Bir horizon and a Btg horizon within a depth of 40 inches. Pineda soils differ from Malabar soils by having the Btg horizon within a depth of 20 to 40 inches rather than below a depth of 40 inches, as in Malabar soils. Pineda soils differ from Riviera and Winder soils by having a Bir horizon above the Btg horizon. Pineda soils differ from Vero soils by lacking a Bh horizon and by having a Bir horizon above the Btg horizon.

Typical pedon of Pineda fine sand from a hammock area about 1.5 miles southeast of the point where canal C-36 enters Lake Hatchineha (SW1/4SE1/4SE1/4 sec. 29, T. 28 S., R. 30 E.):

- A11—0 to 3 inches; very dark gray (10YR 3/1) fine sand; moderate medium granular structure; friable; few fine and medium roots; medium acid; gradual smooth boundary.
- A12—3 to 6 inches; dark gray (10YR 4/1) fine sand; common medium faint gray (10YR 6/1) and light gray (10YR 7/1) mottles; weak medium granular structure; friable; few fine and medium roots; medium acid; gradual smooth boundary.
- A21—6 to 14 inches; light gray (10YR 7/2) fine sand; common medium faint grayish brown (10YR 5/2), light brownish gray (10YR 6/2), and light yellowish brown (10YR 6/4) mottles; single grained; loose; medium acid; gradual wavy boundary.
- A22—14 to 20 inches; very pale brown (10YR 7/4) fine sand; common medium distinct brownish yellow (10YR 6/6, 10YR 6/8) and yellowish brown (10YR 5/6, 10YR 5/8) mottles; single grained; loose; medium acid; clear wavy boundary.
- B2ir—20 to 28 inches; brownish yellow (10YR 6/6) fine sand, common medium distinct yellowish brown (10YR 5/6, 10YR 5/8), strong brown (7.5YR 5/6, 7.5YR 5/8), and reddish yellow (7.5YR 6/6, 7.5YR 6/8) mottles; single grained; loose; sand grains are well coated with iron oxides; neutral; abrupt irregular boundary.
- B2ltg—28 to 35 inches; light gray (5Y 6/1) sandy clay loam; few medium distinct light olive brown (2.5YR 5/6) mottles; massive, crushes to moderate medium subangular blocky structure; friable; sand grains are coated and bridged with clay; few medium tongues of A2 horizon material; neutral; gradual smooth boundary.
- B22tg—35 to 60 inches; greenish gray (5GY 6/1) sandy clay loam; few fine distinct olive (5Y 5/6) mottles; massive, crushes to moderate medium subangular blocky structure; friable; few medium weakly cemented light olive gray (5Y 6/2) loamy fine sand nodules; sand grains are coated and bridged with clay; neutral; gradual smooth boundary.
- B3g—60 to 80 inches; gray (5Y 5/1) sandy loam; common medium faint dark gray (5Y 4/1) and light olive gray (5Y 6/2) mottles; weak medium subangular blocky structure; friable; neutral.

Solum thickness ranges from 40 to more than 80 inches. Reaction is medium acid to slightly acid in the A and Bir horizons and neutral to mildly alkaline in the Btg and C horizons.

The A1 horizon is 6 to 14 inches thick. It has hue of 10YR, value of 2 through 4, and chroma of 1 or 2. Where color value is 3 or less, horizon thickness is less than 10 inches.

The A2 horizon is 4 to 11 inches thick. It has hue of 10YR with value of 5 through 8 and chroma of 1 through 3 or with value of 7 or 8 and chroma of 4.

The Bir horizon is 6 to 16 inches thick. It has hue of 10YR, value of 5 or 6, and chroma of 6 or 8, or hue of 7.5YR, value of 5, and chroma of 6 or 8. Few to common fine or medium white, yellow, brown, and gray mottles occur in many pedons.

Some pedons have an A'2 horizon between the Bir and B2tg horizons. Where this horizon is present, hue is 10YR, value is 5 through 7, and chroma is 1 or 2. Mottles are in shades of yellow and gray. Thickness ranges from 0 to 6 inches.

Some pedons have a Bh horizon immediately above the B2tg horizon. Where this horizon is present, hue is 10YR, value is 3 or 4, and chroma is 2 or 3. It is weakly cemented to noncemented by organic matter. Texture is sand or fine sand, and thickness ranges from 0 to 4 inches.

The B2tg horizon is tongued. It has hue of 10YR, value of 4 through 7, and chroma of 1 or 2; hue of 2.5Y, value of 5 or 6, and chroma of 2; hue of 5Y, value of 5 or 6, and chroma of 1; hue of 5GY, value of 6 or 7, and chroma of 1; or hue of N and value of 6 or 7. It has mottles in shades of gray, brown, yellow, and olive. In some pedons this horizon extends to a depth of more than 80 inches. Texture of the B2tg part is sandy loam, fine sandy loam, or sandy clay loam. Tongues extend vertically into the B2tg horizon from the A2 horizon. Tongues range in width from 1 to 3 inches and in depth from 3 to 10 inches.

Some pedons have a Cg horizon. Where this horizon is present, hue is 10YR, value is 5 through 7, and chroma is 1 or 2, or hue is N and value is 5 through 7. The Cg horizon has few to common fine or medium mottles in shades of yellow, gray, or brown. Texture is loamy sand or sand and contains pockets of sandy loam or sandy clay loam.

Placid series

The Placid series is a member of the sandy, siliceous, hyperthermic family of Typic Humaquepts. It consists of nearly level, very poorly drained, sandy soils. These soils formed in thick beds of sandy marine sediments. They occur in depressions and swamps throughout the flatwoods. Water stands on the surface for 6 to 9 months or more in most years. Slopes are less than 1 percent.

Placid soils are associated with Basinger, Gentry, Immokalee, Malabar, Myakka, Pomello, Ona, and Smyrna soils. Placid soils differ from Basinger soils by having an umbric horizon and by lacking a spodic horizon. Placid soils are distinguished from Gentry soils by lacking an Bt horizon. Placid soils are more poorly drained than Immokalee soils, lack a spodic horizon, and have an umbric epipedon. Placid soils have an umbric epipedon, while Malabar soils do not. Placid soils differ from Myakka, Pomello, Ona, and Smyrna soils by lacking a spodic horizon.

Typical pedon of Placid fine sand, in a grassy depression approximately 5/8 mile south of wooden bridge on Fodderstack Slough and 165 feet west of dirt road (SE1/4NE1/4 sec. 13, T. 30 S., R. 32 E.):

- A11—0 to 14 inches; black (10YR 2/1) fine sand; weak medium granular structure; friable; many fine and medium roots; common coarse pockets of light gray (10YR 7/1) fine sand; extremely acid; gradual wavy boundary.
- A12—14 to 24 inches; very dark gray (10YR 3/1) fine sand; weak medium granular structure; friable; few medium and fine roots in upper few inches; common coarse pockets of light gray (10YR 7/1) fine sand; very strongly acid; gradual wavy boundary.
- C1—24 to 36 inches; light brownish gray (10YR 6/2) fine sand; few medium distinct very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) mottles; single grained; loose; medium acid; gradual smooth boundary.
- C2—36 to 50 inches; light gray (10YR 7/2) fine sand; common medium distinct dark grayish brown (10YR 4/2) and brown (10YR 4/3) mottles; single grained; loose; slightly acid; gradual smooth boundary.
- C3—50 to 80 inches; light gray (10YR 7/1) fine sand; single grained; loose; slightly acid.

Soil reaction ranges from extremely acid to strongly acid in the A horizon and from very strongly acid to slightly acid in the C horizon. Fine sand extends to a depth of more than 80 inches.

The A horizon is 10 to 24 inches thick. It has hue of 10YR, value of 2 or 3, and chroma of 1 or 2, or hue of N and value of 2 or 3.

The C horizon extends to a depth of 80 inches or more. It has hue of 10YR or 5Y, value of 5 through 7, and chroma of 1 or 2; hue of 2.5Y, value of 5 through 7, and chroma of 2; or hue of N and value of 5 through 7.

Placid Variant

The Placid Variant is a member of the sandy, siliceous, hyperthermic family of Quartzipsammentic Haplu-mbrepts. It consists of nearly level, somewhat poorly drained soils that formed in thick deposits of marine sand. These soils occur in the flatwoods and in hammocks as long, narrow areas bordering swamps, marshes, drainageways, and some of the large lakes. Slopes are less than 2 percent. The water table is within a depth of 20 to 40 inches for periods of 6 to 9 months during most years.

Placid Variant soils are associated with Adamsville, Basinger, Immokalee, Myakka, and Pompano soils. Placid Variant soils differ from Adamsville soils by having an umbric epipedon. They differ from Basinger and Pompano soils by being better drained and by having an umbric epipedon. Additionally, they lack the Bh horizon of Basinger soils. Placid Variant soils differ from Immokalee and Myakka soils by lacking a spodic horizon, by being better drained, and by having an umbric epipedon.

Typical pedon of Placid Variant fine sand, from a wooded area 1/4 mile east of Florida Highway 530 and 160 feet north of Florida Highway 530A (SW1/4NW1/4 sec. 8, T. 25 S., R. 30 E.):

A11—0 to 8 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; many fine grass roots; very strongly acid; gradual wavy boundary.

A12—8 to 17 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; very strongly acid; gradual wavy boundary.

C1—17 to 33 inches; gray (10YR 5/1) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

C2—33 to 45 inches; light brownish gray (10YR 6/2) fine sand; few fine faint dark brown (10YR 3/3) mottles; single grained; loose; strongly acid; gradual wavy boundary.

C3—45 to 70 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; medium acid; gradual wavy boundary.

C4—70 to 80 inches; light gray (10YR 7/1) fine sand; single grained; loose; medium acid.

Soil reaction ranges from very strongly acid to medium acid in the A horizon and from very strongly acid to slightly acid in the C horizon. Fine sand extends to a depth of 80 inches or more.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Thickness ranges from 10 to 19 inches.

The C horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. In some pedons, the lower part of the C horizon, below a depth of 70 inches, has value of 2 or 3 and chroma of 1 or 2. Few to common brown, yellow, and gray mottles are in this horizon.

Pomello series

The Pomello series is member of the sandy, siliceous, hyperthermic family of Arenic Haplohumods. It consists of nearly level to gently sloping, moderately well drained

soils that formed in thick deposits of marine sands. Pomello soils occur in transitional areas between the high sand ridges and the flatwoods or on slight knolls and low ridges within the flatwoods. Slopes range from 0 to 5 percent. The water table is at a depth of 24 to 40 inches for about 1 to 4 months in most years during the normal wet seasons. It recedes to a depth between about 40 and 60 inches during the drier seasons.

Pomello soils are associated with Basinger, Candler, Cassia, Immokalee, Myakka, Ona, Placid, Smyrna, St. Lucie, Tavares, and Vero soils. Pomello soils are distinguished from Basinger soils by being better drained and by having a spodic horizon. Pomello soils are more poorly drained than Candler soils and have a spodic horizon. Pomello soils are distinguished from Cassia soils by having an A horizon more than 30 inches thick. Pomello soils differ from Immokalee, Myakka, Ona, Smyrna, and Vero soils by being better drained and by having a lighter colored surface color. Pomello soils differ from Tavares, Placid, and St. Lucie soils by having a spodic horizon. In addition, Placid soils are less well drained than Pomello soils and have an umbric epipedon, and St. Lucie soils are better drained than Pomello soils.

Typical pedon of Pomello fine sand, 0 to 5 percent slopes, in an area of rangeland, 1 mile west of Fell's Cove, 1 mile south of the Orange-Osceola County line, approximately 50 feet north of Florida Highway 530 (SW1/4SW1/4 sec. 1, T. 25 S., R. 30 E.):

A1—0 to 4 inches; gray (10YR 5/1) fine sand; single grained; loose; many fine and medium roots; strongly acid; clear smooth boundary.

A21—4 to 15 inches; gray (10YR 6/1) fine sand; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

A22—15 to 47 inches; white (10YR 8/1) fine sand; few fine faint gray (10YR 5/1) and very dark gray (10YR 3/1) mottles along root channels; single grained; loose; few fine roots; strongly acid; abrupt smooth boundary.

B21h—47 to 52 inches; black (5YR 2/1) fine sand; massive in place, crushes to weak fine granular structure; weakly cemented; very strongly acid; clear smooth boundary.

B22h—52 to 58 inches; dark reddish brown (5YR 3/3) fine sand; common medium faint black (5YR 2/2), reddish brown (5YR 5/4), very dark gray (5YR 3/1), and dark reddish gray (5YR 4/2) mottles; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

B3—58 to 65 inches; brown (10YR 4/3) fine sand; common medium faint dark reddish brown (5YR 3/2) and reddish brown (5YR 4/3, 10YR 4/4) mottles; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

C—65 to 80 inches; grayish brown (10YR 5/2) fine sand; common medium faint dark brown (7.5YR 4/2) mottles; single grained; loose; very strongly acid.

Reaction is very strongly acid or strongly acid in all horizons. Texture is fine sand to a depth of 80 inches or more.

The A1 horizon ranges from 3 to 6 inches in thickness. It has hue of 10YR, value of 4 through 7, and chroma of 1 or 2.

The A2 horizon is 28 to 47 inches in thickness. It has hue of 10YR, value of 5 through 8, and chroma of 1. Mottles are gray and brown.

The B2h horizon ranges from 11 to 16 inches in thickness. This horizon has hue of 5YR, value of 2 or 3, and chroma of 1 through 3; hue of 10YR, value of 2, and chroma of 1; or hue of 7.5YR, value of 3, chroma of 2. Mottles are gray and brown.

The B3 horizon is not in all pedons. Where present, it has hue of 5YR, 7.5YR, or 10YR, value of 3 through 5, and chroma of 2 through 4. Mot-

tles in this horizon are brown or gray. In some pedons, this horizon extends to a depth of more than 80 inches.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 1 through 4. Where present, it extends to a depth of more than 80 inches.

Pomona series

The Pomona series is a member of the sandy, siliceous, hyperthermic family of Ultic Haplaquods. It consists of nearly level, poorly drained soils that formed in sandy and loamy marine sediments. The soils occur on broad, low ridges in the flatwoods. The water table is within a depth of 10 inches for 1 to 3 months and is at a depth of 10 to 40 inches for 6 months or more during most years. Slopes range from 0 to 2 percent.

Pomona soils are associated with Delray, EauGallie, Immokalee, Myakka, Ankona, Placid, Pompano, and Smyrna soils. Pomona soils are not so wet as and are on higher positions in the landscape than Delray and Placid soils. Pomona soils have base saturation of less than 35 percent, and EauGallie soils have base saturation of more than 35 percent. Pomona soils have an argillic horizon, and Myakka, Immokalee, and Smyrna soils do not. Pomona soils have a spodic horizon within a depth of 30 inches, and Ankona soils have a cemented spodic horizon (ortstein) below a depth of 30 inches. Pompano soils lack the spodic and argillic horizons characteristic of Pomona soils.

Typical pedon of Pomona fine sand, in a sparsely wooded area of rangeland 20 feet south of the entrance road to Three Lakes Wildlife Management Area and 700 feet west of Florida Highway 523 (NW1/4NE1/4 sec. 20, T. 29 S., R. 32 E.):

- A11—0 to 5 inches; very dark gray (10YR 3/1) fine sand; weak medium and fine granular structure; very friable; many fine and medium roots; many uncoated white sand grains; extremely acid; clear smooth boundary.
- A12—5 to 9 inches; dark gray (10YR 4/1) fine sand; single grained; loose; common fine and medium roots; many uncoated white sand grains; extremely acid; clear smooth boundary.
- A21—9 to 14 inches; light brownish gray (2.5Y 6/2) fine sand; common medium faint grayish brown (10YR 5/2) mottles; single grained; loose; very strongly acid; clear smooth boundary.
- A22—14 to 24 inches; light gray (10YR 7/2) fine sand; single grained; loose; very strongly acid; abrupt smooth boundary.
- B21h—24 to 28 inches; black (5YR 2/1) fine sand; massive; weakly cemented, firm; very strongly acid; gradual wavy boundary.
- B22h—28 to 32 inches; dark reddish brown (5YR 2/2, 5YR 3/2) fine sand; massive; weakly cemented, firm; very strongly acid; gradual wavy boundary.
- B3—32 to 39 inches; dark brown (7.5YR 3/2, 7.5YR 4/2) fine sand; weak medium granular structure; very friable; very strongly acid; gradual wavy boundary.
- A'21—39 to 58 inches; brown (10YR 5/3) fine sand; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.
- A'22—58 to 69 inches; pale brown (10YR 6/3) fine sand; single grained; loose; very strongly acid; clear wavy boundary.
- B'2tg—69 to 78 inches; gray (10YR 6/1) fine sandy loam; weak medium subangular blocky structure; sand grains are bridged and coated with clay; few lenses of pale brown fine sand; very strongly acid.

Soil reaction ranges from extremely acid to strongly acid in all horizons. Solum thickness ranges from 66 to 80 inches or more.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1. Thickness ranges from 3 to 9 inches.

The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2, or hue of 2.5Y, value of 5 or 6, and chroma of 2. It has few to common mottles of dark gray and gray. Thickness ranges from 9 to 22 inches.

The B2h horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; hue of 5YR, value of 2 or 3, and chroma of 1 or 2; or hue of N and value of 1 or 2. Thickness ranges from 8 to 17 inches.

The B3 horizon has hue of 10YR, value of 3 or 4, and chroma of 3, or hue of 7.5YR, value of 3 or 4, and chroma of 3 or 4. Thickness ranges from 5 to 14 inches.

The A'2 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. In most pedons this horizon is 12 to 24 inches thick, and it ranges from 3 to 33 inches in thickness.

The B'2tg horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2; hue of 5Y, value of 6 and chroma of 2; hue of 2.5Y, value of 5 or 6, and chroma of 2; or hue of N and value of 6 or 7. It has few to common mottles of gray, grayish brown, brownish gray, or brownish yellow. Texture is fine sandy loam or sandy clay loam. There are no to few fine to coarse pockets of fine sand. Thickness ranges from 6 to 17 inches, and in some pedons this horizon extends to a depth of 80 inches or more.

The C horizon, where present, has hue of 10YR, value of 4 or 5, and chroma of 2 or 3, or hue of 2.5Y, value of 5 or 6, and chroma of 2. Texture is fine sand or loamy fine sand.

Pompano series

The Pompano series is a member of the siliceous, hyperthermic family of Typic Psammaquents. It consists of nearly level, poorly drained soils that formed in thick beds of sandy marine sediments. These soils occur in sloughs, along drainageways, and in depressions in the flatwoods. They also occur on broad flats in the St. Johns River basin. The water table is at a depth of less than 10 inches for 2 to 6 months in most years and within 30 inches of the surface for more than 9 months in most years. Depressions are covered with standing water for more than 3 months each year. Slopes are less than 2 percent.

Pompano soils are associated with Basinger, Holopaw, Placid, and Malabar soils. Pompano soils do not have the Bh horizon characteristic of Basinger soils. Pompano soils differ from Holopaw soils by lacking a Bt horizon. Pompano soils are distinguished from Malabar soils by lacking a Bir horizon and a Bt horizon within a depth of 80 inches. Pompano soils lack the umbric epipedon of Placid soils.

Typical pedon of Pompano fine sand, in an open hammock area 0.56 mile south of a poor motor road on Bronson, Inc. property, 0.75 mile east of South Port Canal, and about 7 miles south of St. Cloud (SW1/4NE1/4 sec. 29, T. 27 S., R. 30 E.):

- A11—0 to 5 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; many fine and medium roots; organic matter content less than 1 percent; strongly acid; gradual wavy boundary.
- A12—5 to 12 inches; grayish brown (10YR 5/2) fine sand; few medium faint brownish yellow (10YR 6/6, 10YR 6/8) mottles; single grained; loose; common fine roots; medium acid; gradual wavy boundary.
- C1—12 to 25 inches; light gray (10YR 7/2) fine sand; few fine faint brownish yellow (10YR 6/6), yellowish brown (10YR 5/4, 10YR 5/8), and light yellowish brown (10YR 6/4) mottles; single grained; loose; common fine roots; medium acid; gradual wavy boundary.
- C2—25 to 34 inches; very pale brown (10YR 7/3) fine sand; few medium faint light gray (10YR 7/2), very pale brown (10YR 7/4), and

brownish yellow (10YR 6/6) mottles; single grained; loose; neutral; gradual wavy boundary.

C3—34 to 80 inches; light gray (10YR 7/1) fine sand; few fine faint dark gray (10YR 4/1) streaks; single grained; loose; neutral.

Reaction ranges from strongly acid to neutral in the A horizon and from medium acid to mildly alkaline in the C horizon.

The A horizon ranges from 4 to 12 inches in thickness. Color is in hue of 10YR, value of 2 through 4, and chroma of 1 or 2. Where value is 3 or less, thickness is less than 10 inches. Mottles are black, gray, or brown.

The C horizon extends to a depth of 80 inches or more. This horizon has hue of 10YR, value of 5 through 8, and chroma of 1 through 3. Mottles are gray, brown, and yellow.

Riviera series

The Riviera series is a member of the loamy, siliceous, hyperthermic family of Arenic Glossaqualfs. It consists of nearly level, poorly drained soils. These soils formed in thick beds of sandy and loamy, marine sediments. They occur on broad, low flats, in depressions, and at the edges of large lakes that have fluctuating water levels. They have a water table within a depth of 10 inches for 2 to 4 months in most years and at a depth of 10 to 30 inches for most of the rest of the year. Depressions are covered with standing water for 6 to 12 months. Slopes are less than 2 percent.

Riviera soils are closely associated with Gentry, Delray, Floridana, Holopaw, Parkwood, Pompano, Vero, and Winder soils. Riviera soils differ from Gentry, Delray, and Floridana soils by lacking a mollic epipedon. Riviera soils have a Btg horizon within 20 to 40 inches of the surface, whereas Holopaw soils have a Btg horizon below a depth of 40 inches. Holopaw soils also lack glossic properties. Riviera soils differ from Pompano soils by having a Btg horizon within a depth of 40 inches, whereas Pompano soils are sandy to a depth of 80 inches or more. Riviera soils differ from Vero soils by lacking a Bh horizon. Riviera soils have a Btg horizon within a depth of 20 to 40 inches, whereas Winder and Parkwood soils have a Bt horizon within a depth of 20 inches.

Typical pedon of Riviera fine sand, in a pasture 1.2 miles west of the Sunshine State Parkway and about 1 mile south of Florida Highway 525 (NW1/4NW1/4 sec. 6, T. 25 S., R. 30 E.):

Ap—0 to 6 inches; black (10YR 2/1) fine sand; weak medium granular structure; friable; many fine roots; slightly acid; gradual wavy boundary.

A2—6 to 24 inches; white (10YR 8/1) fine sand; few common distinct grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; common fine distinct dark grayish brown stains along root channels; few lenses of very dark grayish brown (10YR 3/2) in lower part; few fine and medium roots; single grained; loose; very strongly acid; abrupt irregular boundary.

B&A—24 to 38 inches; very dark grayish brown (10YR 3/2) sandy clay loam; few fine distinct dark brown (7.5YR 4/4) and strong brown (7.5YR 5/8) mottles; common coarse distinct white (10YR 8/2) tongues of A2 horizon; weak medium subangular blocky structure; slightly sticky; medium acid; gradual smooth boundary.

B2tg—38 to 49 inches; very dark grayish brown (10YR 3/2) sandy clay loam; common medium faint very dark gray (10YR 3/1) mottles; weak medium subangular blocky structure; slightly sticky; sand grains bridged and coated with clay; slightly acid; gradual smooth boundary.

B3g—49 to 61 inches; dark grayish brown (10YR 4/2) sandy loam; common medium faint very dark gray (10YR 3/1) mottles; weak medium subangular blocky structure; slightly acid; gradual wavy boundary.

C—61 to 80 inches; dark gray (10YR 4/1) loamy sand; common medium faint gray (10YR 5/1, 10YR 6/1) mottles; few pockets of sandy loam and sandy clay loam; weak medium granular structure; friable; slightly acid.

Reaction ranges from very strongly acid to neutral in the A horizon and from neutral to mildly alkaline in the Btg and C horizons.

The A1 horizon is 2 to 8 inches thick. It has hue of 10YR, value of 2 through 5, and chroma of 1 or 2.

The A2 horizon is 18 to 26 inches thick. It has hue of 10YR, value of 6 through 8, and chroma of 1 or 2. Mottles of gray, brown, and yellow occur in this horizon.

The B&A horizon has hue of 10YR or 5Y, value of 3 through 7, and chroma of 1 or 2; hue of 2.5Y, value of 3 through 7, and chroma of 2; or hue of N and value of 3 through 7. Texture of the B part of this horizon is sandy loam or sandy clay loam. Tongues of the A2 horizon extend vertically into the horizon. Thickness ranges from 6 to 24 inches.

The B2tg horizon is 6 to 12 inches thick. It has hue of 10YR or 5Y, value of 3 to 6, and chroma of 1 or 2; hue of 2.5Y, value of 3 through 6, and chroma of 2; or hue of N and value of 3 to 6. Texture is fine sandy loam or sandy clay loam. There are faint to prominent mottles of brown, gray, yellow, and red.

The B3g horizon as described is not present in all pedons. Where this horizon is present, it has hue of 10YR, value of 4 through 7, and chroma of 1 to 3. Texture is loamy fine sand or fine sandy loam.

In some pedons a C horizon is present and extends to a depth of more than 80 inches. It has hue of 10YR or 5Y, value of 5 through 7, and chroma of 1 or 2. Texture ranges from sand to a mixture of sand and shell fragments or of shell fragments and marl.

Samsula series

The Samsula series is a member of the sandy or sandy-skeletal, siliceous, dysic, hyperthermic family of Terric Medisaprists. It consists of very poorly drained, organic soils that formed in moderately thick beds of hydrophytic, nonwoody plant remains and underlying sandy sediments. These soils occur in freshwater marshes and swamps. Slopes are 0 to 1 percent. Under normal conditions, the water table is at or above the surface except during extended dry periods.

Samsula soils are closely associated with Basinger, Hontoon, Immokalee, Myakka, Placid, Smyrna, and Kaliga soils. They differ from Basinger, Immokalee, Myakka, Placid, and Smyrna soils by having organic horizons. Samsula soils are distinguished from Hontoon soils by having mineral horizons within a depth of 51 inches. They are distinguished from Kaliga soils by lacking loamy and clayey mineral horizons within a depth of 51 inches.

Typical pedon of Samsula muck, in a marsh area about 1 mile east of Lake Lizzie and 0.75 mile south of Trout Lake (SE1/4NE1/4 sec. 12, T. 26 S., R. 31 E.):

Oa1—0 to 8 inches; dark reddish brown (5YR 2/2) muck, black (5YR 2/1) rubbed; about 30 percent fiber, 3 percent rubbed; weak medium granular structure; friable; many fine and medium roots; about 19 percent mineral; sodium pyrophosphate extract color is dark brown (10YR 4/3); extremely acid; gradual smooth boundary.

Oa2—8 to 22 inches; black (5YR 2/1) muck, black (5YR 2/1) rubbed; about 40 percent fiber, 4 percent rubbed; massive; slightly sticky; many fine and medium roots; about 35 percent mineral material; sodium pyrophosphate extract color is dark brown (10YR 5/3); extremely acid; gradual smooth boundary.

IIAb—22 to 39 inches; black (10YR 2/1) fine sand; weak medium granular structure; friable; common fine and medium roots; few medium distinct lenses of light gray (10YR 7/1) fine sand; very strongly acid; gradual wavy boundary.

IICb—39 to 65 inches; grayish brown (10YR 5/2) fine sand; few medium faint dark grayish brown (10YR 4/2) mottles; single grained; loose; medium acid.

Reaction of the Oa horizon is less than pH 4.5 when measured in 0.01M calcium chloride. The IIAb and IICb horizons are extremely acid to medium acid.

The Oa horizon has hue of 10YR or 5YR, value of 2 or 3, and chroma of 1 to 3. Fiber content in most pedons is less than 33 percent, unrubbed. Even where fiber content is more than 33 percent unrubbed, it remains less than 16 percent after rubbing. Sodium pyrophosphate extract color is in hue of 10YR with value of 2 through 4 and chroma of 4 or less, with value of 5 and chroma of 2 through 8, with value of 6 and chroma of 3 through 8, or with value of 7 and chroma of 4 through 8.

The IIAb horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2; hue of 2.5Y, value of 2 through 4, and chroma of 2; or hue of N and value of 2 through 4. Thickness ranges from 4 to 17 inches.

The IICb horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Mottles are black, brown, and gray.

Satellite series

The Satellite series is a member of the uncoated, hyperthermic family of Aquic Quartzipsamments. It consists of nearly level, somewhat poorly drained, sandy soils that formed in thick beds of marine sand. These soils occur on low knolls and ridges in the flatwoods. Slopes range from 0 to 2 percent. The water table is at a depth of 10 to 40 inches for periods of 2 to 6 months in most years. In dry seasons, it recedes below a depth of 40 inches.

Satellite soils are closely associated with Basinger, Cassia, Immokalee, Myakka, Placid, Pomello, and Smyrna soils. Satellite soils are distinguished from Basinger soils by lacking a Bh horizon. Satellite soils differ from Cassia, Immokalee, Myakka, Pomello, and Smyrna soils by lacking a spodic horizon. Satellite soils have a thin, light colored A horizon, whereas Placid soils have an umbric epipedon.

Typical pedon of Satellite sand, in a wooded area about 200 feet north of intersection of Sullivan Road and Florida Highway 532, 10 feet east of Sullivan Road (SW1/4SW1/4 sec. 36, T. 25 S., R. 27 E.):

A—0 to 8 inches; gray (10YR 5/1) rubbed sand; single grained; loose; common fine and medium roots; color is a mixture of light gray (10YR 7/1) sand with organic matter; very strongly acid; clear smooth boundary.

C1—8 to 20 inches; white (10YR 8/1) sand; single grained; loose; many medium and few large roots; many medium faint gray (10YR 6/1) stains along root channels; medium acid; gradual wavy boundary.

C2—20 to 30 inches; light gray (10YR 7/1) sand; single grained; loose; common medium faint light brownish gray (10YR 6/2) and gray (10YR 5/1) mottles; many medium and few large roots; medium acid; gradual wavy boundary.

C3—30 to 48 inches; light brownish gray (10YR 6/2) sand; single grained; loose; common medium distinct yellowish red (5YR 4/6, 5YR 4/8) stains along root channels; slightly acid; gradual wavy boundary.

C4—48 to 80 inches; light gray (10YR 6/1) sand; single grained; loose; common medium distinct dark grayish brown (10YR 4/2) mottles and stains along root channels; few medium roots; medium acid.

Reaction ranges from very strongly acid to slightly acid in all horizons. Silt plus clay in the 10- to 40-inch control section is less than 5 percent.

The A horizon is a mixture of black organic matter and white or light gray sand. Rubbed, the color is in hue of 10YR, value of 3 through 5, and chroma of 1 or 2; hue of 2.5Y, value of 4 or 5, and chroma of 2; or hue of N and value of 3 through 5. Thickness ranges from 3 to 8 inches.

The C horizon extends to a depth of more than 80 inches. Color is in hue of 10YR, value of 5 through 7, and chroma of 5 through 7; hue of 2.5Y, value of 5 or 6, and chroma of 2; or hue of N and value of 5 through 7.

Smyrna series

The Smyrna series is a member of the sandy, siliceous, hyperthermic family of Aeris Haplaquods. It consists of nearly level, poorly drained, sandy soils that formed in thick deposits of marine sediments. These soils occur in broad areas in the flatwoods. The water table is within 10 inches of the surface for 1 to 4 months during most years and between depths of 10 and 40 inches for more than 6 months. In rainy seasons, the water table rises above the surface briefly. Slopes range from 0 to 2 percent.

Smyrna soils are closely associated with Cassia, Eau Gallie, Immokalee, Pomello, Myakka, Oldsmar, Ona, Vero, and Wauchula soils. Smyrna soils differ from Cassia and Pomello soils by having a darker colored A1 horizon and by being more poorly drained. Smyrna soils differ from Myakka and Immokalee soils by having a spodic horizon within 20 inches of the surface. Smyrna soils lack the umbric epipedon of Ona soils, and Ona soils lack the A2 horizon of Smyrna soils. Smyrna soils lack the Btg horizon of Vero, Oldsmar, Wauchula, and Eau Gallie soils.

Typical pedon of Smyrna fine sand, from a wooded area about 1.5 miles northwest of intersection of Pleasant Hill Road and Cypress Boulevard (SE1/4NE1/4 sec. 11, T. 27 S., R. 28 E.):

A11—0 to 4 inches; black (N 2/0) fine sand; weak fine granular structure; very friable; common fine, medium, and large roots; many uncoated sand grains; extremely acid; gradual smooth boundary.

A12—4 to 7 inches; dark gray (10YR 4/1) fine sand; few fine pockets of light gray (10YR 7/1) fine sand; few medium very dark gray (10YR 3/1) mottles; single grained; loose; few fine roots; very strongly acid; clear smooth boundary.

A2—7 to 14 inches; light gray (10YR 7/1) fine sand; few medium very dark gray (10YR 3/1) and grayish brown (10YR 5/2) mottles; single grained; loose; medium acid; clear wavy boundary.

B21h—14 to 17 inches; black (5YR 2/1) fine sand; many uncoated white sand grains; weak fine medium subangular blocky structure; friable; very weakly cemented; many fine and medium roots; very strongly acid; gradual wavy boundary.

B22h—17 to 20 inches; dark reddish brown (5YR 3/3) fine sand; common coarse dark reddish brown (5YR 3/4) and reddish brown (5YR 4/4) mottles and few fine dark reddish brown (5YR 2/2) mottles; massive in place, parts to moderate medium subangular blocky structure; friable; very strongly acid; clear wavy boundary.

B3&Bh—20 to 25 inches; brown (10YR 5/3) fine sand; common medium dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) mottles; few fine dark reddish brown (5YR 3/3) weakly cemented spodic fragments and mottles; weak medium subangular blocky structure parting to granular; friable; few medium roots; medium acid; gradual wavy boundary.

A'21—25 to 43 inches; light gray (10YR 7/1) fine sand; few fine brownish yellow (10YR 6/6) mottles; single grained; loose; few fine roots; neutral; clear smooth boundary.

A²—43 to 56 inches; grayish brown (10YR 5/2) fine sand; common coarse dark brown (7.5YR 4/2), pinkish gray (7.5YR 6/2), and gray (10YR 5/1) mottles; single grained; loose; few fine roots; medium acid; gradual irregular boundary.

B²1h—56 to 69 inches; dark reddish brown (5YR 3/2) fine sand; very weakly cemented dark reddish brown (5YR 2/2) spodic fragments 0.2 inch to 2 inches in diameter; weak medium granular structure; friable; few fine roots; strongly acid; gradual irregular boundary.

B²2h—69 to 80 inches; black (5YR 2/1) and dark reddish brown (5YR 3/4) fine sand; weak medium subangular blocky structure; black fine sand has moderate medium subangular blocky structure; friable; strongly acid.

Reaction ranges from extremely acid to neutral in the A, Bh, and A² horizons and from very strongly acid to medium acid in the B²h horizon.

The A1 horizon ranges from 4 to 10 inches in thickness. It has hue of 10YR, value of 2 through 4, and chroma of 2 or less. Where value is 3 or less, thickness is less than 8 inches.

The A2 horizon is 3 to 9 inches thick and has hue of 10YR, value of 5 through 8, and chroma of 1 or 2. Mottles are gray and brown.

The Bh horizon ranges from 6 to 17 inches in thickness. It has hue of 10YR, value of 2, and chroma of 1; hue of 5YR, value of 2 or 3, and chroma of 3 or less; hue of 7.5YR, value of 3, and chroma of 2; or hue of N and value of 2. Mottles are dark reddish brown, reddish brown, or black.

The B3&Bh horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 to 4. Thickness ranges from 5 to 14 inches. Mottles are reddish brown and yellowish brown. This horizon has black, very dark gray, or dark reddish brown Bh fragments ranging from 0.25 inch to 2.5 inches in diameter.

The A² horizon as described is not present in all pedons. Where present, it has hue of 10YR, value of 5 through 7, and chroma of 2 or less. Mottles are gray, brown, and yellow.

The B²h horizon has colors similar to those of the B2h horizon. Where this horizon occurs, it normally extends to a depth of more than 80 inches.

St. Lucie series

The St. Lucie series is a member of the uncoated, hyperthermic family of Typic Quartzipsamments. It consists of nearly level to gently sloping, excessively drained, droughty soils formed in thick deposits of marine sand. These soils occur as narrow, northwest to southeast, discontinuous ridges in the northern and central parts of the survey area. Slopes range from 0 to 5 percent. The water table is below a depth of 72 inches throughout the year.

St. Lucie soils are associated with Candler, Cassia, Immokalee, Myakka, Paola, Pomello, Smyrna, Satellite, and Tavares soils. St. Lucie soils are more droughty and lack the A2 horizon and the lamellae of Candler soils. St. Lucie soils are distinguished from Cassia, Immokalee, Myakka, Pomello, and Smyrna soils by their lack of a spodic horizon and by being better drained. St. Lucie soils are distinguished from Paola soils by lacking a yellow B horizon. St. Lucie soils differ from Satellite soils by being much better drained and by having a slightly lighter colored surface layer. St. Lucie soils are distinguished from Tavares soils by being better drained and by having lighter colors.

Typical pedon of St. Lucie fine sand, 0 to 5 percent slopes, in a wooded area 150 feet south of Florida Highway 532, 1.5 miles south of Lake Preston, and 1.25

miles southeast of Lake Joel (NW1/4NE1/4 sec. 32, T. 25 S., R. 31 E.):

O1—1 inch to 0; forest litter of leaf mold, pine needles, oak leaves, and other partially decomposed leaves, twigs, and grasses.

A1—0 to 4 inches; gray (10YR 5/1) fine sand; single grained; loose; common medium roots; extremely acid; clear wavy boundary.

C1—4 to 13 inches; light gray (10YR 7/1) fine sand; single grained; loose; common medium roots; common fine carbon particles; extremely acid; gradual wavy boundary.

C2—13 to 28 inches; white (10YR 8/1) fine sand; single grained; loose; common medium roots; common medium carbon particles; extremely acid; gradual wavy boundary.

C3—28 to 43 inches; white (10YR 8/1) fine sand; single grained; loose; very strongly acid; gradual wavy boundary.

C4—43 to 80 inches; white (10YR 8/1) fine sand; few medium dark brown (7.5YR 4/2) stains along old root channels; single grained; loose; few medium roots; very strongly acid.

Reaction ranges from extremely acid to strongly acid throughout. Sand extends to a depth of more than 80 inches. Silt plus clay content of the 10- to 40-inch control section is less than 5 percent.

Where undisturbed, the A horizon is a mixture of organic matter and light gray or white sand. Rubbed color is in hue of 10YR, value of 4 through 6, and chroma of 1. Thickness ranges from 1 to 4 inches.

The C horizon has hue of 10YR, value of 6 through 8, and chroma of 1 or 2; hue of 2.5YR, value of 7 or 8, and chroma of 2; or hue of N and value of 6 through 8. Some horizons have mottles of brown or gray.

Tavares series

The Tavares series is a member of the uncoated, hyperthermic family of Typic Quartzipsamments. It consists of nearly level to gently sloping, moderately well drained, sandy soils formed in thick beds of marine sands. These soils occur on low ridges within the flatwoods. Slopes range from 0 to 5 percent. The water table is between depths of 40 and 60 inches for more than 6 months in most years and recedes below a depth of 60 inches in droughty periods.

Tavares soils are closely associated with Adamsville, Candler, Immokalee, Paola, Pomello, and St. Lucie soils. Tavares soils are distinguished from Adamsville soils by having evidence of wetness below a depth of 40 inches and by being better drained. Tavares soils differ from Candler soils by being more poorly drained and by lacking lamellae. Tavares soils differ from Immokalee and Pomello soils by lacking a spodic horizon and by being better drained. They differ from Paola soils by being more poorly drained and by lacking A2 and B&A horizons. Tavares soils are distinguished from St. Lucie soils by being more poorly drained.

Typical pedon of Tavares fine sand, 0 to 5 percent slopes, in a wooded area about 0.5 mile east of U.S. Highway 192 and about 2 miles northwest of Kissimmee Airport (NW1/4NE1/4 sec. 13, T. 25 S., R. 28 E.):

A1—0 to 6 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; very friable; many fine roots; very strongly acid; clear wavy boundary.

C1—6 to 18 inches; grayish brown (10YR 5/2) fine sand; few medium faint pale brown (10YR 6/3) mottles and few fine faint dark gray (10YR 4/1) streaks; single grained; loose; many fine roots; very strongly acid; gradual wavy boundary.

C2—18 to 29 inches; pale brown (10YR 6/3) fine sand; few fine faint splotches of light gray (10YR 7/1) uncoated sand grains; single grained; loose; many fine roots; very strongly acid; gradual wavy boundary.

C3—29 to 48 inches; very pale brown (10YR 7/3) fine sand; few medium to coarse faint pale brown (10YR 6/3) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

C4—48 to 80 inches; white (10YR 8/2) fine sand; few coarse faint very pale brown (10YR 7/3), pale brown (10YR 6/3), and light brownish gray (10YR 6/2) mottles; many fine faint yellow (10YR 7/6) mottles and common fine distinct reddish yellow (7.5YR 6/8) mottles; single grained; loose; few fine roots; very strongly acid.

Reaction is very strongly acid or strongly acid throughout. Silt plus clay content in the 10- to 40-inch control section is less than 5 percent. Fine sand extends to a depth of 80 inches or more.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2, or hue of 2.5Y, value of 3 or 4, and chroma of 2. Thickness ranges from 5 to 9 inches.

The C1 and C2 horizons have hue of 10YR, value of 5 to 7, and chroma of 2 to 6. The C3 and C4 horizons have hue of 10YR, value of 6 to 8, and chroma of 1 to 4. The C3 and C4 horizons have few to many mottles in shades of gray, brown, yellow, and red below a depth of 40 inches. Large splotches or mottles with chroma of 2 or less are within a depth of 30 inches, but these are colors of the sand grains and are not interpreted as evidence of wetness.

Vero series

The Vero series is a member of the sandy over loamy, siliceous, hyperthermic family of Alfic Haplaquods. It consists of nearly level, poorly drained soils formed in sandy and loamy marine deposits. These soils occur in broad areas in the flatwoods. A water table is within a depth of 10 inches for 1 to 4 months and between depths of 10 and 40 inches for 6 months or more in most years. In some pedons, following heavy rainfall in dry periods, the water table is perched above the spodic horizon for periods of a few days to less than 30 days. Slopes range from 0 to 2 percent.

Vero soils are associated with Basinger, EauGallie, Myakka, Oldsmar, Riviera, Smyrna, and Wauchula soils. Vero soils are distinguished from Basinger soils by having a spodic horizon and an argillic horizon. Vero soils differ from EauGallie soils in that the argillic horizon is within 40 inches of the surface in Vero soils. Vero soils differ from Myakka and Smyrna soils by having an argillic horizon beneath the spodic horizon. Vero soils are distinguished from Oldsmar soils by having a spodic horizon within 30 inches of the surface and an argillic horizon within 40 inches of the surface. Vero soils differ from Riviera soils by having a spodic horizon. Vero soils are distinguished from Wauchula soils by having base saturation of more than 35 percent in the argillic horizon.

Typical pedon of Vero fine sand, in a wooded area on Gulf American Corporation property near the north end of Johnson Island (NW1/4NW1/4 sec. 34, T. 26 S., R. 28 E.):

A11—0 to 7 inches; black (10YR 2/1) rubbed fine sand; weak fine granular structure; very friable; common fine, medium, and large roots; mixture of organic matter and uncoated sand grains gives a salt-and-pepper appearance; extremely acid; gradual wavy boundary.

A12—7 to 10 inches; dark gray (10YR 4/1) rubbed fine sand; single grained; loose; common fine, medium, and large roots; mixture of organic matter and uncoated sand grains; extremely acid; gradual wavy boundary.

A2—10 to 21 inches; light gray (10YR 7/1) fine sand; few medium distinct very dark gray (10YR 3/1) mottles and dark grayish brown (10YR 4/2) stains along root channels; single grained; loose; few fine and medium roots; strongly acid; abrupt wavy boundary.

B21h—21 to 24 inches; dark brown (10YR 3/3) fine sand; common coarse distinct grayish brown (10YR 5/2) mottles; few very dark brown (10YR 2/2) soft nodules; weak fine granular structure; friable; few fine and medium roots; neutral; clear wavy boundary.

B22h—24 to 28 inches; black (10YR 2/1) fine sand; few medium faint very dark grayish brown (10YR 3/2) mottles; massive; friable; slight cementation; sand grains coated with colloidal organic material; neutral; clear wavy boundary.

B21t—28 to 32 inches; brown (10YR 5/3) fine sandy loam; few coarse distinct dark reddish brown (5YR 3/3), yellowish brown (10YR 5/6), and brownish yellow (10YR 6/8) mottles and few black (10YR 2/1) stains along root channels; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; few uncoated sand grains; neutral; clear wavy boundary.

B22tg—32 to 48 inches; light brownish gray (10YR 6/2) sandy clay loam; few medium distinct light gray (10YR 6/1) and grayish brown (10YR 5/2) mottles, many coarse distinct brownish yellow (10YR 6/6) mottles, and few medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky; few discontinuous clay films on pedis; sand grains coated with clay; mildly alkaline; gradual wavy boundary.

B23tg—48 to 62 inches; gray (10YR 6/1) sandy clay loam; few fine distinct reddish yellow (5YR 6/8) mottles, few medium faint light brownish gray (10YR 6/2) and pinkish gray (7.5YR 6/2) mottles, and common medium distinct red (2.5YR 5/6) and brownish yellow (10YR 6/6) mottles; few brown 0.25 to 1 inch diameter hard concretions; moderate medium subangular blocky structure; friable, slightly sticky; dark grayish brown (10YR 4/2) clay films in root channels; mildly alkaline; gradual wavy boundary.

C1g—62 to 80 inches; greenish gray (5GY 5/1) fine sandy loam; common medium distinct white (10YR 8/1) and light olive brown (2.5Y 5/4, 2.5Y 5/6) mottles and olive brown (2.5Y 4/4) stains along root channels; massive; friable, slightly sticky; moderately alkaline; gradual wavy boundary.

C2g—80 to 99 inches; greenish gray (5GY 5/1) loamy fine sand; common medium distinct gray (5Y 5/1) and white (10YR 8/1) pockets of fine sand; massive; friable; moderately alkaline.

Total thickness of the A horizon is less than 30 inches, and texture is sand or fine sand. Reaction ranges from extremely acid to strongly acid.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1, or hue of N and value of 2 through 4. Where value is 3 or less, thickness is less than 10 inches.

The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2; hue of 2.5Y, value of 5 through 7, and chroma of 2; or hue of N and value of 5 through 7. A thin transitional horizon is at the base of the A2 horizon in many pedons.

Reaction in the Bh horizon ranges from very strongly acid to slightly acid. Texture is sand, fine sand, loamy sand, or loamy fine sand. The Bh horizon has hue of 10YR or 5YR with value of 2 and chroma of 1 or 2 or with value of 3 and chroma of 3 or 4; hue of 7.5YR, value of 3, and chroma of 2; or hue of N and value of 2. Some pedons have a B3&Bh horizon at the base of the Bh horizon. Where the B3&Bh horizon is present, it has hue of 10YR, value of 3 to 5, and chroma of 3 or 4, or hue of 7.5YR, value of 4, and chroma of 2 or 4. It contains few to common Bh horizon fragments.

Depth to the upper boundary of the Btg horizon is less than 40 inches. The Btg horizon has hue of 10YR, value of 4 through 7, and chroma of 1 through 3; hue of 2.5Y, value of 5 or 6, and chroma of 2; or hue of N and value of 5 or 6. Texture is sandy loam, fine sandy loam, or sandy clay loam. Reaction ranges from medium acid to moderately alkaline. Base saturation is more than 35 percent.

An A₂ horizon is between the Bh and Btg horizons in some pedons. Where the A₂ horizon is present, it has hue of 10YR, value of 4 to 7, and chroma of 1 or 2; hue of 2.5Y, value of 4 to 7, and chroma of 2; or hue of N and value of 4 to 7. Texture is sand or fine sand.

The Cg horizon has color similar to that of the Btg horizon; additionally, it has hue of 5Y or 5GY, value of 5 through 7, and chroma of 1. Texture ranges from sand to fine sandy loam. Reaction is mildly alkaline or moderately alkaline.

Wauchula series

The Wauchula series is a member of the sandy, siliceous, hyperthermic family of Ultic Haplaquods. It consists of nearly level, poorly drained soils that formed in sandy and loamy marine deposits. These soils occur in broad areas in the flatwoods. The water table is within 10 inches of the surface for 1 to 4 months during most years. It is within a depth of about 10 to 40 inches for about 6 months in most years, but during the driest seasons, it recedes below a depth of 40 inches. Slopes range from 0 to 2 percent.

Wauchula soils are associated with EauGallie, Immokalee, Myakka, Oldsmar, Ona, Pomello, Smyrna, and Vero soils. Wauchula soils are distinguished from EauGallie soils by having a Btg horizon which has base saturation of less than 35 percent and which is less than 40 inches below the surface. Wauchula soils differ from Immokalee soils by having a Bh horizon within a depth of 30 inches and by having a Bt horizon. Wauchula soils are distinguished from Myakka and Smyrna soils by having a Btg horizon beneath the Bh horizon. Wauchula soils differ from Oldsmar soils by having a Bh horizon within a depth of 30 inches and a Btg horizon which has base saturation of less than 35 percent. Wauchula soils are distinguished from Ona soils by lacking an A₂ horizon and a Btg horizon. They have a darker colored surface layer and a Bh horizon within a depth of 30 inches, and Pomello soils do not. Wauchula soils differ from Vero soils in that base saturation of the Btg horizon is less than 35 percent.

Typical pedon of Wauchula fine sand, from a wooded area on Gulf American Corporation property (NE1/4NW1/4 sec. 34, T. 26 S., R. 28 E.):

A1—0 to 8 inches; very dark gray (10YR 3/1 crushed) fine sand; weak medium granular structure; very friable; common fine, medium, and coarse roots; color is a mixture of light gray sand grains and black organic matter; extremely acid; clear smooth boundary.

A21—8 to 11 inches; gray (10YR 5/1) fine sand; few coarse faint dark gray (10YR 4/1) mottles; single grained; loose; few fine and medium roots; very strongly acid; clear smooth boundary.

A22—11 to 28 inches; light gray (10YR 7/1) fine sand; few medium faint dark grayish brown (10YR 4/2) mottles and stains along root channels; single grained; loose; strongly acid; abrupt wavy boundary.

B21h—28 to 33 inches; black (5YR 2/1) loamy fine sand; massive in place, crushes to weak medium subangular blocky structure; weakly cemented; few fine roots; extremely acid; gradual wavy boundary.

B22h—33 to 37 inches; dark brown (7.5YR 3/2) loamy fine sand; common medium faint black (N 2/0) mottles; massive in place, crushes to moderate medium subangular blocky structure; firm; weakly cemented; few very dark grayish brown (10YR 3/2) indurated sand concretions 1/2 inch to 2 inches in diameter; very strongly acid; clear wavy boundary.

A₂&Bh—37 to 41 inches; pale brown (10YR 5/3) loamy fine sand; weak fine subangular blocky structure; friable; few medium and coarse

black (10YR 2/1) weakly cemented spodic fragments; very strongly acid; clear wavy boundary.

B₂tg—41 to 54 inches; light brownish gray (2.5Y 6/2) sandy clay loam; weak fine subangular blocky structure that crushes to weak medium granular; friable, slightly sticky; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary.

C_g—54 to 82 inches; light brownish gray (2.5Y 6/2) fine sandy loam; massive; friable, slightly sticky; very strongly acid; gradual wavy boundary.

Reaction ranges from extremely acid to strongly acid in the A and Bh horizons and is very strongly acid or strongly acid in the B₂tg and C horizons.

The A₁ horizon ranges in thickness from 4 to 8 inches. It has hue of 10YR, value of 3 or less, and chroma of 1 or 2.

The A₂ horizon ranges in thickness from 8 to 24 inches. It has hue of 10YR, value of 5 through 8, and chroma of 1 or 2.

The Bh horizon ranges from 6 to 12 inches in thickness. It has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 1 through 3. Texture is fine sand or loamy fine sand.

The A₂&Bh horizon is 3 or 4 inches thick. It has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. Texture is fine sand or loamy fine sand.

The B₂tg horizon has hue of 10YR or 5Y, value of 4 to 6, and chroma of 2 or less; hue of 2.5Y, value of 4 to 6, and chroma of 2; or hue of N and value of 4 to 6. Mottles of gray, brown, and yellow are in this horizon. Thickness ranges from 10 to more than 44 inches. Where thickness is more than 44 inches, this horizon extends to a depth of more than 80 inches. Texture is fine sandy loam or sandy clay loam.

The C_g horizon extends to a depth of more than 80 inches. Color is similar to that of the B₂tg horizon. Texture is loamy fine sand or fine sandy loam or lenses or streaks of these textures.

Winder series

The Winder series is a member of the fine-loamy, siliceous, hyperthermic family of Typic Glossaqualfs. It consists of nearly level, poorly drained soils that formed in thick beds of loamy marine sediments. These soils occur on broad, low flats along lakes and streams. The water table is at a depth of 0 to 10 inches for about 2 to 6 months during most years. Some areas are flooded for periods ranging from a few days to about 3 months. Slopes are less than 2 percent.

Winder soils are closely associated with Gentry, Delray, Floridana, Holopaw, Parkwood, Pineda, and Riviera soils. Winder soils differ from Gentry soils by lacking a mollic epipedon and by having glossic properties. Winder soils differ from Delray, Floridana, and Holopaw soils by having a Btg horizon within a depth of 20 inches. Additionally, Delray, and Floridana soils have a mollic epipedon. Winder soils differ from Parkwood soils by lacking a Btca horizon and from Pineda and Riviera soils by having a Btg horizon within a depth of 20 inches. Additionally, Pineda soils have a Bir horizon.

Typical pedon of Winder loamy fine sand, from a pasture 1.75 miles east of Pleasant Hill Road 531 and about 3 miles south of Florida Highway 192 (NE1/4NE1/4 sec. 16, T. 26 S., R. 29 E.):

A1—0 to 3 inches; very dark gray (10YR 3/1) loamy fine sand; weak fine granular structure; very friable; many fine roots; very slightly acid; clear smooth boundary.

A2—3 to 14 inches; gray (10YR 6/1) fine sand; few medium distinct very dark grayish brown (10YR 3/2) mottles; single grained; loose; few

medium and fine roots; very slightly acid; gradual irregular boundary.

B&A—14 to 20 inches; dark gray (10YR 4/1) sandy clay loam; few fine distinct yellowish brown streaks along root channels; common coarse distinct gray (10YR 6/1) vertical fine sand tongues; moderate medium subangular blocky structure; friable; common fine roots; sand grains coated with clay; mildly alkaline; gradual irregular boundary.

B2tg—20 to 34 inches; dark gray (10YR 4/1) sandy clay loam; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; mildly alkaline; gradual smooth boundary.

B3g—34 to 52 inches; light gray (5Y 6/1) fine sandy loam; few medium distinct dark gray (5Y 4/1) mottles; weak fine subangular blocky structure; very friable; mildly alkaline; clear wavy boundary.

IICg—52 to 80 inches; light gray (5Y 7/2) loamy fine sand; few fine faint white (5YR 8/1) carbonitic mottles; weak fine granular structure; very friable; moderately alkaline; calcareous.

Solum thickness ranges from 30 to 54 inches. Reaction is medium acid or slightly acid in the A horizon and neutral to moderately alkaline in the Btg and IICg horizons.

The A1 horizon is 2 to 8 inches thick. It has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

The A2 horizon is 5 to 12 inches thick. It has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Texture is fine sand or loamy fine sand. Combined thickness of the A horizon is less than 20 inches.

The B&A horizon is 3 to 6 inches thick. It has hue of 10YR or 5Y, value of 4 through 7, and chroma of 1 or 2. Texture of the B part of this horizon ranges from sandy loam to sandy clay loam. Texture of the A part is fine sand or loamy fine sand. Average clay content is 18 to 25 percent but ranges to 35 percent.

The B2tg horizon has color similar to the B part of the B&A horizon. It is fine sandy loam or sandy clay loam. Few to common fine or medium yellow, brown, and olive mottles occur throughout the horizon. Thickness ranges from 12 to 28 inches.

The B3g horizon as described is not present in all pedons. Where it is present, color is similar to the Btg horizon. Texture is fine sandy loam or loamy fine sand.

The IICg horizon has hue of 10YR through 5Y, value of 5 through 7, and chroma of 1 through 6. It is sandy loam or sandy clay loam. Few to many fine or medium white, brown, and yellow, carbonitic mottles occur throughout this horizon.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (8).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 22, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of domi-

nant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Psammaquents (*Psamm*, meaning sandy horizons, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceeding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Psammaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is siliceous, hyperthermic Typic Psammaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Formation of the soils

In this section, the process of soil formation are discussed and related to the soils in the survey area.

Factors of soil formation

Soil is produced by forces of weathering acting on the parent material that has been deposited or accumulated by geologic agencies. The kind of soil that develops depends on five major factors. These factors are the climate under which soil material has existed since accumulation; the plant and animal life in and on the soil; the type of parent material; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

The five soil-forming factors are interdependent; each modifies the effect of the others. Any one of the five factors can have more influence than the others on the formation of a soil and can account for most of its properties. For example, if the parent material is quartz sand, the soil generally has only weakly expressed horizons. The effect of the parent material is modified greatly in some places by the effects of climate, relief, and plants and animals in and on the soil. As a soil forms, it is influenced by more than one of the five factors, but in some places all but one factor can have little effect. A modification or variation in any of these factors results in a different soil.

Parent material

The parent material of most of the soils of Osceola County Area is unconsolidated sandy and loamy marine sediments of the Pleistocene and Recent geological ages. Most of this material is inert or very low in weatherable minerals. Below this layer are sand and shells of the Caloosahatchee Marl Formation that were deposited during the Pliocene age (4). They are not exposed or near enough to the surface to greatly affect the soils in the survey area. Windblown sands and organic matter accumulations of Recent times are parent materials for some soils.

Myakka and Immokalee soils are representative of the soils that formed in thick beds of loose sands. Floridana and Malabar soils formed an argillic horizon by translocation of clayey materials in stratified sediments. Such soils as Candler, Paola, and St. Lucie formed in Recent wind-blown quartz sands on the northwest ridge. Hontoon and Samsula soils formed in Recent accumulations of organic material in low, wet places.

Climate

The amount of precipitation, the temperature, the humidity, and the wind are the climatic forces that act on the parent materials of soils. These forces also cause some variation in the plant and animal life on and in the soils. In this way, they influence changes in the parent material and, consequently, soil development.

This area has a warm, humid climate. Warm, moist air from the Atlantic Ocean or the Gulf of Mexico and the numerous inland lakes has a moderating effect on summer and winter temperatures. Summer temperatures

are fairly uniform from year to year and show little day-to-day variation. Winter temperatures, however, display considerable day-to-day variation. Rainfall averages about 53 inches a year.

Because of the warm climate and abundance of rainfall, chemical and biological actions are rapid. The abundance of rainfall leaches the soils of much of the plant nutrients.

Plants and animals

Plants have been the principal biological factors in the formation of soils in this survey area. Animals, insects, bacteria, and fungi also have been important to the chief functions of the plant and animal life or to furnish organic matter and to bring plant nutrients from the lower to the upper horizons. Differences in the amount of organic matter, nitrogen, and plant nutrients in the soils and differences in soil structure and porosity are among those caused by plants and animals.

Relief

Relief has affected the formation of soils in Osceola County Area primarily through its influence on soil-water relationships. Other factors of soil formation normally associated with relief, such as erosion, temperature, and plant cover, are of minor importance in the survey area.

Three general areas—*flatwoods*, *swamps and marshes*, and *northwest ridge*—are in the survey area. There are differences in soils between these general areas directly related to relief.

The soils in the flatwoods area have a high water table and are periodically wet to the surface. The soils, therefore, are not so highly leached as those of the northwest ridge. The soils in the swamps and marshes are covered with water for long periods of time and in many places have high organic matter content. The soils in the northwest ridge are on higher elevations than those in the flatwoods and swamps and marshes. The deep sandy soils on the ridge are mostly excessively drained and are not influenced by a ground water table. These soils are more subject to erosion than soils in other parts of the survey area.

Time

Time is an important factor in soil formation. The physical and chemical changes brought about by climate, living organisms, and relief are slow. The length of time needed to convert raw geological materials into soil varies according to the nature of the geologic material and the interaction of the other factors. Some basic minerals from which soils are formed weather fairly rapidly, while other minerals are chemically inert and show little change over long periods of time. The translocation of fine particles within the soil to form the various horizons is variable under different conditions, but the processes always involve relatively long periods of time.

In Osceola County Area, the dominant geological materials are inactive. The sands are almost pure quartz and are highly resistant to weathering. The finer textured silts and clays are the product of earlier weathering.

In terms of geological time, relatively little time has elapsed since the material in which the soils in the survey area have developed was laid down or emerged from the sea. The loamy and clayey horizons formed in place through processes of clay translocation.

Processes of soil formation

Soil morphology refers to the process involved in the formation of the soil horizon or soil horizon differentiation. The differentiation of horizons in soils in Osceola County Area is the result of accumulation of organic matter, leaching of carbonates, reduction and transfer of iron, or accumulation of silicate clay minerals, or more than one of these processes.

Some organic matter has accumulated in the upper layers of most of the soils to form an A1 horizon. The quantity of organic matter is small in some of the soils but fairly large in others.

Carbonates and salts have been leached in all of the soils. The effects of leaching have been indirect in that the leaching permitted the subsequent translocation of silicate clay materials in some soils. Most of the soils of the survey area are leached to varying degrees.

Reduction and transfer of iron has occurred in most of the soils in the survey area except the organic soils. In some of the wet soils, iron has been segregated within the deeper horizons to form reddish brown mottles and concretions. In the Candler soil, there is evidence of wetting and clay movement or alteration in the form of a thick, light colored, leached A2 horizon and lamellae that have sand grains coated and bridged with clay materials.

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Glossary

Absorption field. The area into which a subsurface system of tile or perforated pipe distributes effluent from a septic tank into natural soil.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	<i>Inches</i>
Very low	0 to 3
Low	3 to 6
Medium	6 to 9
High	More than 9

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bedding. A partial method of controlling excess water for the growth of citrus and other crops using regularly spaced shallow ditches and beds.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Calcareous soil. A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deep to water. Deep to permanent water table during dry season.

Deferred grazing. A delay in grazing until range plants have reached a specified stage of growth. Grazing is deferred in order to increase the vigor of forage and to allow desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional

water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Excess humus. Too much organic matter for intended use.

Excess salt. A harmful concentration of salts and exchangeable sodium in such location that growth of most crop plants is less than normal.

Excessive permeability. The rapid movement of water through the soil at rates adversely affecting the specified use.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fill. Raise the surface level of the land to the desired level with suitable soil material.

Flatwoods. Broad, nearly level, low ridges of poorly drained, dominantly sandy soils with a characteristic vegetation of open forest of pines and a ground cover of sawpalmetto and pineland threeweed.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Forb. Any herbaceous plant not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A₂ horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants are those that follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Land shaping. Rearrangement of soil materials by cutting and filling to form a more suitable site for the intended use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. Intermediate in texture and properties between fine textured and coarse textured. Includes all textural classes with the words "loamy" or "loam" as part of the class name, for example, loamy sand or sandy clay loam. This term is also used as a particle-size class in family differentiae for mineral soils.

Low strength. Inadequate strength for supporting loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common, and many*; size—*fine, medium, and coarse*; and contrast—*faint, distinct, and prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mounding. Filling the area for the absorption field with suitable soil material to the level above the water table necessary to meet local and State requirements.

Muck. Dark colored, finely divided, well decomposed organic soil material mixed with mineral soil material. The content of organic matter is more than 20 percent.

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

No practical measures known. No feasible or practical measures to overcome adverse soil properties for the selected use are known.

No water. Too deep to ground water.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs rapidly. See Excessive permeability.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water of subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Range (or rangeland). Land that, for the most part, produces native plants suitable for grazing by livestock; includes land supporting some forest trees.

Range condition. The health or productivity of forage plants on a given range, in terms of the potential productivity under normal climate and the best practical management. Condition classes generally recognized are—*excellent*, *good*, *fair*, and *poor*. The classification is based on the percentage of original, or assumed climax vegetation on a site, as compared to what has been observed to grow on it when well managed.

Range site. An area of range where climate, soil, and relief are sufficiently uniform to produce a distinct kind and amount of native vegetation.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seal or line. Seal or line the bottom and sides of excavations and trenches to prevent the downward and lateral movement of water.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shear strength. A laboratory determination which is used in conjunction with other laboratory data to evaluate the load supporting capability of a soil.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shore side slopes. Construct walls along sides of excavated trenches to prevent soil from caving.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slough. A broad, usually grassy, slightly depressional, poorly defined drainageway.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil blowing. Soil easily moved and deposited by wind.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.005 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Special equipment. Equipment needed that can traverse soft and wet soils of low strength.

Standing water. Shallow water standing above the soil surface for long (usually more than 3 months) periods of time.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsidence. Lowering of the surface of an organic soil or of a soil containing semifluid layers after lowering of the water table.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface stabilization. Stabilize the surface by an appropriate means so that vehicles or foot traffic can traverse an area.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*,

silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Too clayey. Soil slippery and sticky when wet and slow to dry.

Too sandy. Soil soft and loose; droughty and low in fertility.

Too salty (See *Excess salt*).

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited

geographic soil area does not justify creation of a new series.

Water control. Regulate the water table according to the need of the intended use by canals, ditches, tile, pumping, or any other appropriate method.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Wetness. Soil wet during period of use.

Illustrations



Figure 1.—Travel trailer parks are common near the Walt Disney World recreational complex. This one is on Tavares fine sand, 0 to 5 percent slopes.



Figure 2.—This trench type sanitary landfill is in an area of Arents, 0 to 5 percent slopes. The surface is covered daily with a thin layer of soil. These areas do not make good sites for building construction.

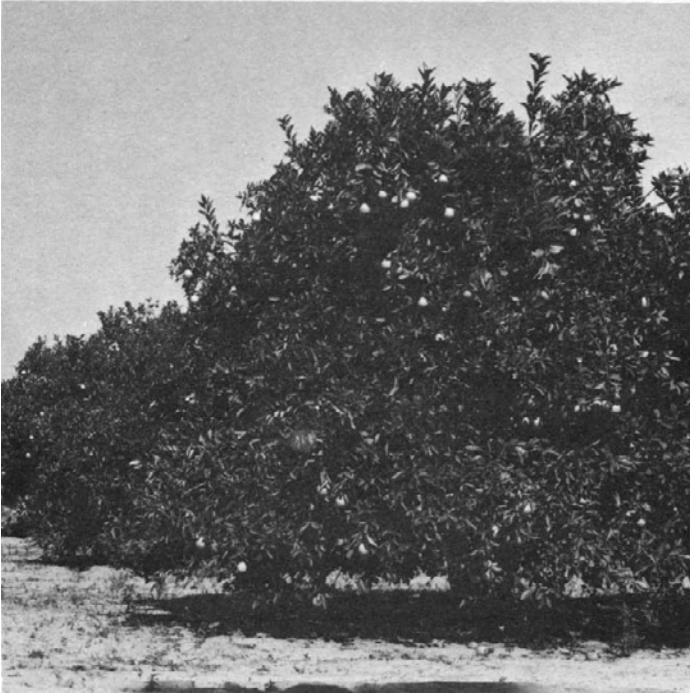


Figure 3.—These orange trees are growing on Candler sand, 0 to 5 percent slopes. Candler soils are among the best soils in the survey area for growing citrus trees.



Figure 4.—This is an area of Malabar fine sand, depressional. Water stands above the soil surface for 6 to 12 months of most years.

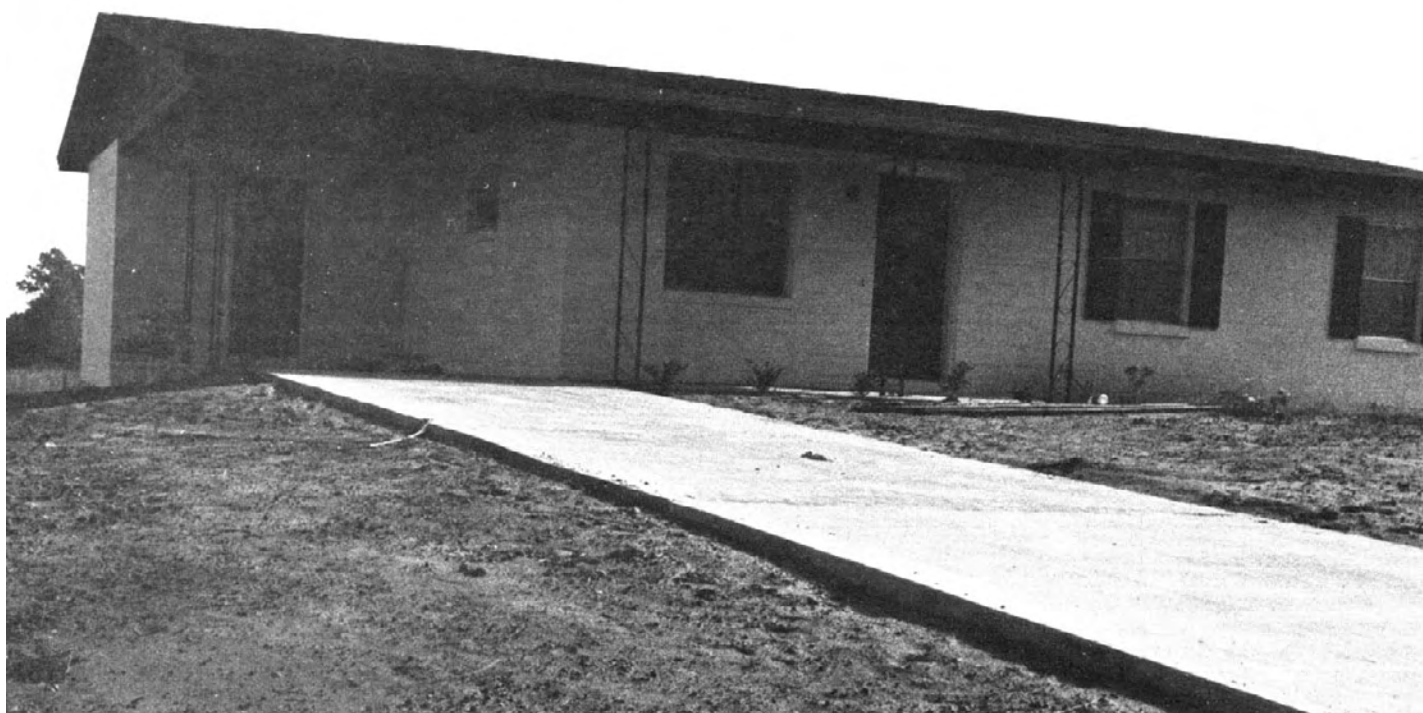


Figure 5.—This house site has been built up with good soil material in order to provide an adequate elevation above the high water table. The soil is Malabar fine sand, depressional.



Figure 6.—These live oaks are growing in a hammock on Narcoossee fine sand.



Figure 7.—Red maple growing on Nittaw muck.



Figure 8.—Eagle nests in tall longleaf pine trees are not uncommon in the survey area. This area of Smyrna fine sand has been planted to bahiagrass pasture.



Figure 9.—These Brahman cattle are being fed bahiagrass hay during the winter months to supplement grazing. The soil is Riviera fine sand.



Figure 10.—This woodland area is being used for livestock grazing. The native grasses have been closely grazed, and sawpalmetto covers much of the area. The soil is Myakka fine sand.



Figure 11.—This excavated pond is in an area of EauGallie fine sand. Many pits from which soil material has been removed for road construction make excellent ponds and provide good fishing when stocked with fish.

Tables

SOIL SURVEY

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

[Information extracted from U.S. Department of Commerce, NOAA, "Climatography of the United States No. 86-6, Climatic Summary of the United States--Supplement for 1951 through 1960, Florida. Data recorded at Kissimmee]

Month	Temperature					Precipitation				
	Monthly normal mean	Normal daily maximum	Normal daily minimum	Mean number of days with temperature of		Normal total	Maximum total	Minimum total	Mean number of days with rainfall of--	
				90° F or higher	32° F or lower				0.10 inch or more	0.50 inch or more
	°F	°F	°F			In	In	In		
January---	60.9	72.2	49.8	0	2	1.91	5.17	0.46	4	1
February--	62.6	74.0	50.7	0	1	2.44	5.68	0.45	4	2
March----	66.2	78.8	55.1	1	0	4.03	12.46	0.58	6	3
April-----	71.2	83.2	59.9	2	0	3.34	5.95	1.72	6	2
May-----	76.4	88.7	65.0	15	0	3.61	6.97	2.14	6	2
June-----	80.2	90.8	70.0	21	0	7.75	10.94	3.08	10	5
July-----	81.4	91.5	72.1	25	0	8.03	12.18	3.31	11	5
August----	81.8	91.7	72.4	25	0	6.83	13.34	2.10	11	4
September-	80.0	89.3	70.9	18	0	7.25	20.61	4.03	11	6
October---	74.2	84.0	64.9	3	0	3.97	17.47	0.80	7	3
November--	66.7	77.7	56.3	0	(*)	1.74	6.27	0	2	1
December--	61.9	72.8	50.4	0	1	1.90	4.08	0.35	3	1
Year----	72.0	82.9	61.5	110	4	52.80	80.38	40.38	81	35

*Less than half a day.

TABLE 2.--FREEZE DATA

[Information extracted from U.S. Department of Commerce, NOAA, Climatography of the United States No. 60-8. Climate of Florida, Revised June 1972. Data recorded at Kissimmee]

Freeze threshold Temperature	Mean date of last spring occurrence	Mean date of first fall occurrence	Mean number of days be- tween dates	Years of record, spring	Number of occurrences in spring	Years of record, fall	Number of occurrences in fall
32	January 25	December 24	334	27	18	26	11
28	January 6	*	*	26	5	26	3
24	*	*	*	26	1	26	0
20	*	*	*	26	0	26	0

*Frequency of occurrence in either spring or fall is one year in 10, or less.

TABLE 3.--POTENTIALS AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP

[See text for definitions of potential ratings. To reach potential, limitations must be overcome]

Map unit	Extent of area	Community development	Citrus	Improved pasture	Woodland
	Pct				
1. Candler-Immokalee-----	2	Very high-----	High: droughty.	Very low: droughty.	Low: droughty.
2. Immokalee-Pomello-Myakka---	6	Medium: wetness, cutbanks cave.	Low: wetness.	Medium: wetness.	Low: wetness.
3. Myakka-Tavares-Immokalee---	5	Medium: wetness, cutbanks cave.	Low: wetness.	Medium: wetness.	Low: wetness.
4. Smyrna-Myakka-Immokalee----	46	Medium: wetness, cutbanks cave.	Low: wetness.	Medium: wetness.	Medium: wetness.
5. EauGallie-Smyrna-Malabar---	16	Medium: wetness, cutbanks cave.	Low: wetness.	Medium: wetness.	Medium: wetness.
6. Riviera-Vero-----	4	Medium: wetness.	Medium: wetness.	Medium: wetness.	Medium: wetness.
7. Malabar-Pompano-Delray----	2	Low: wetness, standing water, cutbanks cave.	Very low: wetness, standing water, poor outlets.	Very low: wetness, standing water, poor outlets.	Low: wetness, standing water, poor outlets.
8. Basinger-Placid-Samsula----	4	Low: wetness, standing water, cutbanks cave.	Very low: wetness, standing water, poor outlets.	Very low: wetness, standing water, poor outlets.	Low: wetness, standing water, poor outlets.
9. Kaliga-Nittaw-Gentry-----	6	Very low: floods, excess humus, low strength, shrink-swell, percs slowly.	Very low: wetness, excess humus.	High: wetness.	Very low: wetness, excess humus.
10. Hontoon-Samsula-----	6	Very low: excess humus, wetness, standing water, low strength.	Very low: wetness, standing water, excess humus.	High: wetness.	Very low: wetness, standing water, excess humus.
11. Pompano-----	3	Low: wetness, standing water, cutbanks cave.	Very low: wetness, standing water, poor outlets.	Very low: wetness, standing water, poor outlets.	Low: wetness, standing water, poor outlets.

SOIL SURVEY

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Adamsville sand-----	5,648	0.9
2	Adamsville Variant fine sand, 0 to 5 percent slopes-----	1,025	0.2
3	Ankona fine sand-----	1,122	0.2
4	Arents, 0 to 5 percent slopes-----	3,024	0.5
5	Basinger fine sand-----	30,018	4.5
6	Basinger fine sand, depressional-----	39,534	6.0
7	Candler sand, 0 to 5 percent slopes-----	6,041	0.9
8	Candler sand, 5 to 12 percent slopes-----	2,146	0.3
9	Cassia fine sand-----	5,594	0.8
10	Delray loamy fine sand-----	8,930	1.3
11	EauGallie fine sand-----	41,178	6.2
12	Floridana fine sand-----	6,770	1.0
13	Gentry fine sand-----	3,545	0.5
14	Holopaw fine sand-----	5,955	0.9
15	Hontoon muck-----	22,849	3.4
16	Immokalee fine sand-----	56,820	8.6
17	Kaliga muck-----	9,939	1.5
18	Lokosee fine sand-----	11,100	1.7
19	Malabar fine sand-----	27,742	4.2
20	Malabar fine sand, depressional-----	4,616	0.7
21	Malabar-Pineda complex-----	824	0.1
22	Myakka fine sand-----	75,233	11.4
23	Myakka-Urban land complex-----	5,102	0.8
24	Narcoossee fine sand-----	4,148	0.6
25	Nittaw muck-----	7,988	1.2
26	Oldsmar fine sand-----	8,138	1.2
27	Ona fine sand-----	3,568	0.5
28	Paola sand, 0 to 5 percent slopes-----	464	0.1
29	Parkwood loamy fine sand-----	1,653	0.2
30	Pineda fine sand-----	5,059	0.8
31	Pits-----	618	0.1
32	Placid fine sand-----	21,919	3.3
33	Placid Variant fine sand-----	976	0.1
34	Pomello fine sand, 0 to 5 percent slopes-----	11,695	1.8
35	Pomona fine sand-----	6,989	1.1
36	Pompano fine sand-----	8,125	1.2
37	Pompano fine sand, depressional-----	11,771	1.8
38	Riviera fine sand-----	10,555	1.6
39	Riviera fine sand, depressional-----	11,441	1.7
40	Samsula muck-----	20,549	3.1
41	Satellite sand-----	3,692	0.6
42	Smyrna fine sand-----	126,182	19.0
43	St. Lucie fine sand, 0 to 5 percent slopes-----	2,440	0.4
44	Tavares fine sand, 0 to 5 percent slopes-----	6,646	1.0
45	Vero fine sand-----	5,132	0.8
46	Wauchula fine sand-----	1,933	0.3
47	Winder loamy fine sand-----	5,276	0.8
	Water-----	788	0.1
	Total-----	662,500	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[All yields were estimated for a high level of management in 1976. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Oranges	Grapefruit	Tomatoes	Cabbage	Watermelons	Bahiagrass	Grass- clover
	Box	Box	Ton	Crate	Ton	AUM*	AUM*
1----- Adamsville	375	500	7	400	---	7.0	10.0
2----- Adamsville Variant	---	---	---	---	---	---	---
3----- Ankona	350	525	8	320	---	8.0	12.0
4**. Arents							
5----- Basinger	350	450	13	400	---	8.0	12.0
6----- Basinger	---	---	---	---	---	---	---
7----- Candler	425	625	---	---	10	7.0	---
8----- Candler	400	600	---	---	---	6.5	---
9----- Cassia	250	350	---	---	---	6.0	---
10----- Delray	---	---	---	---	---	---	---
11----- EauGallie	375	575	8	250	---	8.0	12.0
12----- Floridana	---	---	---	---	---	---	---
13----- Gentry	---	---	14	250	---	10.0	13.0
14----- Holopaw	375	575	7	240	---	8.0	10
15----- Hontoon	---	---	---	315	---	---	---
16----- Immokalee	350	550	15	200	---	7.5	12.0
17----- Kaliga	---	---	---	280	---	12.0	15.0
18----- Lokosee	375	400	8	250	---	8.0	12.0
19----- Malabar	325	575	13	200	---	8.0	12.0
20----- Malabar	---	---	---	---	---	---	---
21**: Malabar-----	325	575	13	200	---	8.0	12.0
Pineda-----	425	575	13	250	---	8.0	12.0

See footnote at end of table.

SOIL SURVEY

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Oranges	Grapefruit	Tomatoes	Cabbage	Watermelons	Bahiagrass	Grass- clover
	<u>Box</u>	<u>Box</u>	<u>Ton</u>	<u>Crate</u>	<u>Ton</u>	<u>AUM#</u>	<u>AUM#</u>
22----- Myakka	350	550	15	320	---	9.0	12.0
23----- Myakka	---	---	---	---	---	---	---
24----- Narcoossee	350	450	---	---	---	6.0	---
25----- Nittaw	---	---	6	250	---	12.0	15.0
26----- Oldsmar	325	525	8	---	---	9.0	---
27----- Ona	350	550	12	300	---	8.5	12.0
28----- Paola	250	300	---	---	---	---	---
29----- Parkwood	450	650	8	375	---	9.0	12.0
30----- Pineda	425	575	13	250	---	8.0	12.0
31**. Pits							
32----- Placid	---	---	---	---	---	---	---
33----- Placid Variant	350	500	4	300	---	8.0	11.0
34----- Pomello	250	400	---	---	---	3.5	---
35----- Pomona	350	550	9	320	9.5	8.0	10.0
36----- Pompano	300	400	500	260	---	8.0	10.0
37----- Pompano	---	---	---	---	---	---	---
38----- Riviera	425	575	---	400	---	8.0	12.0
39----- Riviera	---	---	---	---	---	---	---
40----- Samsula	---	---	---	315	---	12.0	15.0
41----- Satellite	---	---	---	---	5.0	5.0	---
42----- Smyrna	350	550	15	200	9.5	8.0	12.0
43----- St. Lucie	---	---	---	---	---	---	---
44----- Tavares	425	600	---	---	8	8.0	---

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Oranges	Grapefruit	Tomatoes	Cabbage	Watermelons	Bahiagrass	Grass- clover
	<u>Box</u>	<u>Box</u>	<u>Ton</u>	<u>Crate</u>	<u>Ton</u>	<u>AUM*</u>	<u>AUM*</u>
45----- Vero	400	575	13	250	---	8.0	12.0
46----- Wauchula	400	575	13	250	---	10.0	12.0
47----- Winder	---	---	8	250	---	9.0	12.0

*Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, or five sheep, or five goats) for a period of 30 days.

**See map unit description for the composition and behavior of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas excluded. Absence of an entry means no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
I	---	---	---	---	---
II	---	---	---	---	---
III	120,883	---	14,237	6,646	---
IV	431,610	---	419,975	11,635	---
V	---	---	---	---	---
VI	12,997	---	---	17,997	---
VII	85,502	---	83,062	2,440	---
VIII	---	---	---	---	---

SOIL SURVEY

TABLE 7.--POTENTIAL PRODUCTION AND COMPOSITION OF LIVESTOCK FORAGE

[Absence of an entry means that the soil does not produce significant amounts of forage]

Soil name and map symbol	Potential production		Composition of forage		
	Kind of year	Dry weight	Grasses and grasslikes	Forbs	Woody plants and trees
		<u>Lb/acre</u>	<u>Pct</u>	<u>Pct</u>	<u>Pct</u>
1----- Adamsville	Favorable-----	3,500	40	20	40
	Normal-----	3,000			
	Unfavorable-----	2,000			
2----- Adamsville Variant	Favorable-----	3,500	40	20	40
	Normal-----	3,000			
	Unfavorable-----	2,000			
3----- Ankona	Favorable-----	6,000	75	10	15
	Normal-----	4,500			
	Unfavorable-----	3,000			
4*. Arents					
5----- Basinger	Favorable-----	6,000	85	15	Trace
	Normal-----	5,000			
	Unfavorable-----	2,000			
6**----- Basinger	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			
7,8----- Candler	Favorable-----	4,000	60	20	20
	Normal-----	3,000			
	Unfavorable-----	2,000			
9----- Cassia	Favorable-----	3,500	40	20	40
	Normal-----	2,500			
	Unfavorable-----	1,500			
10----- Delray	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			
11----- EauGallie	Favorable-----	6,000	75	10	15
	Normal-----	4,500			
	Unfavorable-----	3,000			
12----- Floridana	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			
13. Gentry					
14----- Holopaw	Favorable-----	9,000	70	15	15
	Normal-----	7,500			
	Unfavorable-----	4,500			
15**----- Hontoon	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			
16----- Immokalee	Favorable-----	6,000	75	10	15
	Normal-----	4,500			
	Unfavorable-----	3,000			
17----- Kaliga	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			

See footnotes at end of table.

TABLE 7.--POTENTIAL PRODUCTION AND COMPOSITION OF LIVESTOCK FORAGE--Continued

Soil name and map symbol	Potential production		Composition of forage		
	Kind of year	Dry weight	Grasses and grasslikes	Forbs	Woody plants and trees
		<u>Lb/acre</u>	<u>Pct</u>	<u>Pct</u>	<u>Pct</u>
18----- Lokosee	Favorable-----	9,000	70	15	15
	Normal-----	7,500			
	Unfavorable-----	4,500			
19----- Malabar	Favorable-----	6,000	85	15	Trace
	Normal-----	5,000			
	Unfavorable-----	2,000			
20**----- Malabar	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			
21*: Malabar-----	Favorable-----	6,000	85	15	Trace
	Normal-----	5,000			
	Unfavorable-----	2,000			
Pineda-----	Favorable-----	6,000	85	15	Trace
	Normal-----	5,000			
	Unfavorable-----	2,000			
22----- Myakka	Favorable-----	6,000	75	10	15
	Normal-----	4,500			
	Unfavorable-----	3,000			
23*. Myakka-Urban land					
24----- Narcoossee	Favorable-----	3,500	40	20	40
	Normal-----	3,000			
	Unfavorable-----	2,000			
25. Nittaw					
26----- Oldsmar	Favorable-----	6,000	75	10	15
	Normal-----	4,500			
	Unfavorable-----	3,000			
27----- Ona	Favorable-----	6,000	75	10	15
	Normal-----	4,500			
	Unfavorable-----	3,000			
28----- Paola	Favorable-----	3,500	40	20	40
	Normal-----	2,500			
	Unfavorable-----	1,500			
29----- Parkwood	Favorable-----	4,000	55	20	25
	Normal-----	3,000			
	Unfavorable-----	2,000			
30----- Pineda	Favorable-----	6,000	85	15	Trace
	Normal-----	5,000			
	Unfavorable-----	2,000			
31*. Pits					
32----- Placid	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			
33----- Placid Variant	Favorable-----	3,500	40	20	40
	Normal-----	3,000			
	Unfavorable-----	2,000			

See footnotes at end of table.

TABLE 7.--POTENTIAL PRODUCTION AND COMPOSITION OF LIVESTOCK FORAGE--Continued

Soil name and map symbol	Potential production		Composition of forage		
	Kind of year	Dry weight	Grasses and grasslikes	Forbs	Woody plants and trees
		Lb/acre	Pct	Pct	Pct
34----- Pomello	Favorable-----	3,500	40	20	40
	Normal-----	2,500			
	Unfavorable-----	1,500			
35----- Pomona	Favorable-----	6,000	75	10	15
	Normal-----	5,000			
	Unfavorable-----	2,000			
36----- Pompano	Favorable-----	6,000	85	15	Trace
	Normal-----	5,000			
	Unfavorable-----	2,000			
37*----- Pompano	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			
38----- Riviera	Favorable-----	9,000	70	15	15
	Normal-----	7,500			
	Unfavorable-----	4,500			
39**----- Riviera	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			
40**----- Samsula	Favorable-----	10,000	85	15	Trace
	Normal-----	8,000			
	Unfavorable-----	4,500			
41----- Satellite	Favorable-----	3,500	40	20	40
	Normal-----	2,500			
	Unfavorable-----	1,500			
42----- Smyrna	Favorable-----	6,000	75	10	15
	Normal-----	4,500			
	Unfavorable-----	3,000			
43----- St. Lucie	Favorable-----	3,500	40	20	40
	Normal-----	2,500			
	Unfavorable-----	1,500			
44----- Tavares	Favorable-----	4,000	60	20	20
	Normal-----	3,000			
	Unfavorable-----	2,000			
45----- Vero	Favorable-----	6,000	75	10	15
	Normal-----	4,500			
	Unfavorable-----	3,000			
46----- Wauchula	Favorable-----	6,000	75	10	15
	Normal-----	4,500			
	Unfavorable-----	3,000			
47----- Winder	Favorable-----	9,000	70	15	15
	Normal-----	7,500			
	Unfavorable-----	4,500			

*See map unit description for the composition and behavior of the map unit.

**Areas of this soil in swamp vegetation do not produce significant amounts of forage.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column means the information was not available. The potential productivity site indexes are estimates based on site index measurements in other areas in central and south Florida. Site index was calculated at age 30 for eastern cottonwood, at age 35 for American sycamore, and at age 50 for all other species.

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
1----- Adamsville	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
3----- Ankona	4w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	70 60	Slash pine.
5----- Basinger	4w	Slight	Severe	Moderate	Moderate	Slash pine----- Longleaf pine-----	70 60	Slash pine.
6----- Basinger	4w	Slight	Severe	Severe	Severe	Pond pine-----	60	
7, 8----- Candler	4s	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine----- Sand pine-----	70 60 75	Sand pine, slash pine.
9----- Cassia	4s	Slight	Moderate	Severe	Moderate	Slash pine----- Longleaf pine-----	70 60	Sand pine.
10----- Delray	2w	Slight	Severe	Severe	Moderate	Slash pine----- Longleaf pine----- Sweetgum-----	90 70 90	Slash pine, sweetgum.
11----- EauGallie	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
12----- Floridana	3w	Slight	Severe	Severe	Severe	Slash pine-----	75	Slash pine.
13----- Gentry	2w	Slight	Severe	Severe	Severe	Baldcypress----- Sweetgum-----	70 80	Slash pine, sweetgum.
14----- Holopaw	3w	Slight	Moderate	Severe	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
16----- Immokalee	4w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	70 65	Slash pine.
17----- Kaliga	4w	Slight	Severe	Severe	Severe	Sweetgum-----	70	Sweetgum.
18----- Lokosee	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
19----- Malabar	3w	Slight	Moderate	Severe	Moderate	Slash pine----- Longleaf pine----- Pond pine-----	75 65 60	Slash pine.
20----- Malabar	3w	Slight	Severe	Severe	Severe	Slash pine----- Longleaf pine----- Pond pine-----	75 65 60	Slash pine.
21*: Malabar-----	3w	Slight	Moderate	Severe	Moderate	Slash pine----- Longleaf pine----- Pond pine-----	75 65 60	Slash pine.
Pineda-----	3w	Slight	Moderate	Severe	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
22----- Myakka	4w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	70 60	Slash pine.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
23*: Myakka-----	4w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	70 60	Slash pine.
Urban land.								
24----- Narcoossee	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
25----- Nittaw	2w	Slight	Severe	Severe	Moderate	Slash pine----- Sweetgum-----	90 90	Slash pine, sweetgum.
26----- Oldsmar	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
27----- Ona	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
28----- Paola	5s	Slight	Moderate	Severe	Slight	Sand pine----- Slash pine-----	60 60	Sand pine.
29----- Parkwood	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
30----- Pineda	3w	Slight	Moderate	Severe	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
32----- Placid	3w	Slight	Severe	Severe	Severe	Slash pine-----	80	Slash pine.
33----- Placid Variant	2w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine----- Live oak-----	80 70 80	Slash pine.
34----- Pomello	4s	Slight	Moderate	Severe	Moderate	Slash pine----- Longleaf pine----- Sand pine-----	65 60 70	Sand pine.
35----- Pompano	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
36----- Pompano	4w	Slight	Severe	Severe	Moderate	Slash pine----- Pond pine-----	70 60	Slash pine.
37----- Pompano	4w	Slight	Severe	Severe	Severe	Slash pine----- Pond pine-----	70 60	Slash pine.
38, 39----- Riviera	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
41----- Satellite	4s	Slight	Moderate	Severe	Moderate	Slash pine----- Longleaf pine----- Sand pine-----	65 60 70	Slash pine, sand pine.
42----- Smyrna	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
43----- St. Lucie	5s	Slight	Moderate	Severe	Slight	Sand pine-----	60	Sand pine.
44----- Tavares	3s	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	80 75	Slash pine.
45----- Vero	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Plant competi- tion	Common trees	Site index	
46----- Wauchula	3w	Slight	Moderate	Moderate	Moderate	Slash pine----- Longleaf pine-----	75 65	Slash pine.
47----- Winder	2w	Slight	Moderate	Moderate	Moderate	Slash pine----- Pond pine-----	90 60	Slash pine.

* See map unit description for the composition and behavior of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1----- Adamsville	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
2----- Adamsville Variant	Severe: cutbanks cave, excess humus, wetness.	Severe: low strength.	Severe: wetness, low strength.	Severe: low strength.	Severe: low strength.
3----- Ankona	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
4*. Arents					
5----- Basinger	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: corrosive, wetness.	Severe: wetness.
6----- Basinger	Severe: cutbanks cave, wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: corrosive, wetness, ponding.	Severe: wetness, ponding.
7----- Candler	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
8----- Candler	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
9----- Cassia	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, corrosive.	Moderate: wetness.
10----- Delray	Severe: cutbanks cave, wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.
11----- EauGallie	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
12----- Floridana	Severe: cutbanks cave, wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.
13----- Gentry	Severe: cutbanks cave, wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, floods.
14----- Holopaw	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
15----- Hontoon	Severe: excess humus, wetness.	Severe: excess humus, low strength, wetness.	Severe: excess humus, low strength, wetness.	Severe: excess humus, wetness, low strength.	Severe: excess humus, low strength, wetness.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
16----- Immokalee	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
17----- Kaliga	Severe: too clayey, wetness.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.	Severe: low strength, wetness.
18----- Lokosee	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
19----- Malabar	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
20----- Malabar	Severe: cutbanks cave, wetness, ponding.	Severe: ponding, wetness.	Severe: ponding, wetness.	Severe: ponding, wetness.	Severe: wetness, ponding.
21*: Malabar-----	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pineda-----	Severe: cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
22----- Myakka	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
23*: Myakka-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.					
24----- Narcoossee	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
25----- Nittaw	Severe: floods, wetness, too clayey.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: low strength, wetness, floods.
26----- Oldsmar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: corrosive, wetness.	Severe: wetness.
27----- Ona	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
28----- Paola	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
29----- Parkwood	Severe: floods, cutbanks cave, wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
30----- Pineda	Severe: cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
31*. Pits					
32----- Placid	Severe: wetness, cutbanks cave, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: ponding, wetness.	Severe: wetness, ponding.
33----- Placid Variant	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
34----- Pomello	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: corrosive, wetness.	Slight.
35----- Pomona	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
36----- Pompano	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness, corrosive.	Severe: wetness.
37----- Pompano	Severe: wetness, cutbanks cave, ponding.	Severe: ponding, wetness.	Severe: ponding, wetness.	Severe: ponding, wetness, corrosive.	Severe: wetness, ponding.
38----- Riviera	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: corrosive, wetness.	Severe: wetness.
39----- Riviera	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: corrosive, wetness, ponding.	Severe: wetness, ponding.
40----- Samsula	Severe: cutbanks cave, wetness.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness, low strength.	Severe: low strength, wetness.
41----- Satellite	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
42----- Smyrna	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: corrosive, wetness.	Severe: wetness.
43----- St. Lucie	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight.
44----- Tavares	Severe: cutbanks cave.	Slight-----	Moderate: wetness.	Slight-----	Slight.
45----- Vero	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
46----- Wauchula	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
47----- Winder	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, corrosive, wetness.	Severe: floods, wetness.

* See map unit description for the composition and behavior of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "severe," "fair," and "poor." Absence of an entry means soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1----- Adamsville	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: seepage.	Poor: seepage, wetness.
2----- Adamsville Variant	Severe: wetness.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, excess humus.
3----- Ankona	Severe: wetness, percs slowly, cemented pan.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness.	Poor: too sandy, wetness.
4*. Arents					
5----- Basinger	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: too sandy, seepage, wetness.
6----- Basinger	Severe: wetness, ponding.	Severe: seepage, wetness, ponding.	Severe: seepage, wetness, ponding.	Severe: seepage, wetness, ponding.	Poor: too sandy, seepage, wetness.
7----- Candler	Slight-----	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
8----- Candler	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
9----- Cassia	Severe: wetness.	Severe: seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: too sandy, seepage.
10----- Delray	Severe: wetness, ponding.	Severe: wetness, ponding, seepage.	Severe: wetness, ponding, seepage.	Severe: wetness, ponding, seepage.	Poor: too sandy, wetness, seepage.
11----- EauGallie	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: too sandy, wetness.
12----- Floridana	Severe: wetness, ponding, percs slowly.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Poor: wetness.
13----- Gentry	Severe: floods, wetness, percs slowly.	Severe: seepage, floods, wetness.	Severe: floods, seepage, wetness.	Severe: floods, seepage, wetness.	Poor: too sandy, wetness.
14----- Holopaw	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, too sandy.

See footnote at end of table.

SOIL SURVEY

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
15----- Hontoon	Severe: wetness.	Severe: excess humus, seepage, wetness.	Severe: excess humus, seepage, wetness.	Severe: wetness, seepage.	Poor: excess humus, seepage, wetness.
16----- Immokalee	Severe: wetness.	Severe: seepage, wetness.	Severe: too sandy, wetness.	Severe: seepage.	Poor: seepage, too sandy, wetness.
17----- Kaliga	Severe: wetness, percs slowly.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: too clayey, hard to pack, wetness.
18----- Lokosee	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness, seepage.	Poor: too sandy, wetness.
19----- Malabar	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: too sandy, wetness.
20----- Malabar	Severe: ponding, wetness.	Severe: wetness, seepage, ponding.	Severe: ponding, seepage, wetness.	Severe: ponding, seepage, wetness.	Poor: too sandy, wetness.
21*: Malabar-----	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: too sandy, wetness.
Pineda-----	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: thin layer, seepage.
22----- Myakka	Severe: wetness.	Severe: seepage, wetness.	Severe: too sandy, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
23*: Myakka-----	Severe: wetness.	Severe: seepage, wetness.	Severe: too sandy, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Urban land.					
24----- Narcoossee	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: too sandy.
25----- Nittaw	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, seepage, wetness.	Severe: floods, wetness.	Poor: wetness, too clayey.
26----- Oldsmar	Severe: wetness, percs slowly.	Severe: wetness.	Severe: seepage, too sandy, wetness.	Severe: wetness, seepage.	Poor: too sandy, wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
27----- Ona	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, too sandy, seepage.	Severe: wetness, seepage.	Poor: too sandy, wetness.
28----- Paola	Slight-----	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
29----- Parkwood	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, seepage, wetness.	Severe: floods, seepage, wetness.	Poor: seepage, too sandy, wetness.
30----- Pineda	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: thin layer, seepage.
31*. Pits					
32----- Placid	Severe: ponding, wetness.	Severe: ponding, wetness.	Severe: ponding, seepage, wetness.	Severe: ponding, seepage, wetness.	Poor: wetness, too sandy, seepage.
33----- Placid Variant	Severe: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Poor: too sandy.
34----- Pomello	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, too sandy, wetness.	Severe: seepage, wetness.	Poor: too sandy, seepage, wetness.
35----- Pomona	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
36----- Pompano	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, seepage, too sandy.
37----- Pompano	Severe: ponding, wetness.	Severe: seepage, wetness, ponding.	Severe: ponding, seepage, wetness.	Severe: ponding, seepage, wetness.	Poor: wetness, seepage, too sandy.
38----- Riviera	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
39----- Riviera	Severe: wetness, ponding, percs slowly.	Severe: wetness, ponding, seepage.	Severe: wetness, seepage, ponding.	Severe: seepage, wetness, ponding.	Poor: wetness.
40----- Samsula	Severe: wetness.	Severe: seepage, wetness.	Severe: excess humus, seepage, wetness.	Severe: seepage, wetness.	Poor: hard to pack, wetness.
41----- Satellite	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: seepage.	Poor: seepage, wetness, too sandy.

See footnote at end of table.

SOIL SURVEY

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
42----- Smyrna	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: too sandy, seepage, wetness.
43----- St. Lucie	Slight-----	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
44----- Tavares	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: too sandy.
45----- Vero	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
46----- Wauchula	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: too sandy, wetness.
47----- Winder	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.

*See map unit description for the composition and behavior of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," and "unsuited." Absence of an entry means soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1----- Adamsville	Good-----	Fair: excess fines.	Unsuited-----	Poor: too sandy.
2----- Adamsville Variant	Poor: low strength.	Poor: thin layer.	Unsuited-----	Poor: too sandy.
3----- Ankona	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
4*. Arents				
5, 6----- Basinger	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy.
7, 8----- Candler	Good-----	Good-----	Unsuited-----	Poor: too sandy.
9----- Cassia	Fair: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy.
10----- Delray	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
11----- EauGallie	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
12----- Floridana	Poor: wetness.	Poor: excess fines.	Unsuited-----	Poor: too sandy, wetness.
13----- Gentry	Poor: wetness.	Poor: thin layer.	Unsuited-----	Poor: too sandy, wetness.
14----- Holopaw	Poor: wetness.	Good-----	Unsuited-----	Poor: too sandy, wetness.
15----- Hontoon	Poor: excess humus, low strength, wetness.	Unsuited-----	Unsuited-----	Poor: wetness.
16----- Immokalee	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy.
17----- Kaliga	Poor: low strength, wetness, shrink-swell.	Poor: excess fines, excess humus.	Unsuited-----	Poor: excess humus, wetness.
18----- Lokosee	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
19, 20----- Malabar	Poor: wetness.	Poor: excess fines.	Unsuited-----	Poor: wetness, too sandy.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
21*: Malabar-----	Poor: wetness.	Poor: excess fines.	Unsuited-----	Poor: wetness, too sandy.
Pineda-----	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
22----- Myakka	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy.
23*: Myakka-----	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy.
Urban land.				
24----- Narcoossee	Fair: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy.
25----- Nittaw	Poor: wetness, shrink-swell, low strength.	Poor: excess fines.	Unsuited-----	Poor: excess humus, wetness.
26----- Oldsmar	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
27----- Ona	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
28----- Paola	Good-----	Good-----	Unsuited-----	Poor: too sandy.
29----- Parkwood	Poor: wetness.	Poor: excess fines.	Unsuited-----	Poor: too sandy, wetness.
30----- Pineda	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
31*. Pits				
32----- Placid	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
33----- Placid Variant	Fair: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy.
34----- Pomello	Good-----	Fair: excess fines.	Unsuited-----	Poor: too sandy.
35----- Pomona	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
36, 37----- Pompano	Poor: wetness.	Good-----	Unsuited-----	Poor: too sandy, wetness.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
38, 39----- Riviera	Poor: wetness.	Poor: excess fines.	Unsuited-----	Poor: too sandy, wetness.
40----- Samsula	Poor: low strength, wetness.	Unsuited-----	Unsuited-----	Poor: excess humus, wetness.
41----- Satellite	Fair: wetness.	Good-----	Unsuited-----	Poor: too sandy.
42----- Smyrna	Poor: wetness.	Fair: excess fines.	Unsuited-----	Poor: too sandy, wetness.
43----- St. Lucie	Good-----	Good-----	Unsuited-----	Poor: too sandy.
44----- Tavares	Good-----	Good-----	Unsuited-----	Poor: too sandy.
45----- Vero	Poor: wetness.	Poor: excess fines.	Unsuited-----	Poor: too sandy, wetness.
46----- Wauchula	Poor: wetness.	Poor: excess fines.	Unsuited-----	Poor: too sandy.
47----- Winder	Poor: wetness.	Poor: excess fines.	Unsuited-----	Poor: thin layer, wetness.

See map unit description for the composition and behavior of the map unit.

SOIL SURVEY

TABLE 12.--WATER MANAGEMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not evaluated]

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
1----- Adamsville	Severe: seepage.	Severe: seepage, piping.	Moderate: deep to water.	Cutbanks cave--	Wetness, seepage.	Not needed.
2----- Adamsville Variant	Severe: seepage.	Severe: seepage, piping, excess humus.	Moderate: deep to water.	Excess humus---	Wetness, droughty, fast intake.	Not needed.
3----- Ankona	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill.	Percs slowly---	Wetness, fast intake, percs slowly.	Not needed.
4*. Arents						
5----- Basinger	Severe: seepage.	Severe: seepage, piping, unstable fill.	Slight-----	Cutbanks cave--	Wetness-----	Not needed.
6----- Basinger	Severe: seepage.	Severe: seepage, piping, unstable fill.	Slight-----	Cutbanks cave, ponding, poor outlets.	Wetness, ponding.	Not needed.
7, 8----- Candler	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Not needed-----	Droughty, seepage, fast intake.	Not needed.
9----- Cassia	Severe: seepage.	Severe: seepage, unstable fill, piping.	Moderate: deep to water.	Cutbanks cave--	Fast intake, droughty.	Not needed.
10----- Delray	Severe: seepage.	Moderate: piping, seepage.	Slight-----	Cutbanks cave, poor outlets, ponding.	Wetness, ponding.	Not needed.
11----- EauGallie	Severe: seepage.	Severe: seepage, unstable fill.	Moderate: deep to water.	Cutbanks cave--	Fast intake, wetness.	Not needed.
12----- Floridana	Moderate: seepage.	Severe: seepage, piping, unstable fill.	Slight-----	Poor outlets, cutbanks cave, ponding, percs slowly.	Wetness, ponding, percs slowly.	Not needed.
13----- Gentry	Severe: seepage.	Severe: wetness.	Severe: slow refill.	Floods, percs slowly.	Wetness, fast intake, percs slowly.	Not needed.
14----- Holopaw	Severe: seepage.	Severe: piping, seepage.	Slight-----	Cutbanks cave--	Wetness, fast intake.	Not needed.
15----- Hontoon	Severe: excess humus, seepage.	Severe: compressible, low strength, excess humus.	Slight: favorable.	Excess humus, poor outlets.	Favorable-----	Not needed.
16----- Immokalee	Severe: seepage.	Severe: seepage, piping, erodes easily.	Moderate: deep to water.	Cutbanks cave--	Wetness-----	Not needed.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
17----- Kaliga	Severe: seepage.	Severe: excess humus, wetness.	Severe: slow refill.	Percs slowly, excess humus.	Wetness-----	Not needed.
18----- Lokosee	Severe: seepage.	Severe: seepage, piping, wetness.	Moderate: slow refill.	Favorable-----	Wetness, droughty, fast intake.	Not needed.
19----- Malabar	Severe: seepage.	Severe: seepage, unstable fill,	Slight-----	Cutbanks cave--	Wetness-----	Not needed.
20----- Malabar	Severe: seepage.	Severe: seepage, unstable fill, piping.	Slight-----	Cutbanks cave, ponding.	Wetness, ponding.	Not needed.
21*: Malabar-----	Severe: seepage.	Severe: seepage, unstable fill, piping.	Slight-----	Cutbanks cave--	Wetness-----	Not needed.
Pineda-----	Severe: seepage.	Moderate: seepage, thin layer, unstable fill.	Moderate: deep to water.	Cutbanks cave, percs slowly.	Wetness, percs slowly.	Not needed.
22----- Myakka	Severe: seepage.	Severe: seepage, piping, erodes easily.	Moderate: deep to water.	Cutbanks cave--	Wetness-----	Not needed.
23*: Myakka-----	Severe: seepage.	Severe: seepage, piping, erodes easily.	Moderate: deep to water.	Cutbanks cave--	Wetness-----	Not needed.
Urban land.						
24----- Narcoossee	Severe: seepage.	Severe: seepage, piping.	Moderate: deep to water.	Cutbanks cave--	Wetness, droughty, fast intake.	Not needed.
25----- Nittaw	Slight-----	Severe: wetness.	Severe: slow refill.	Floods, percs slowly.	Wetness, percs slowly, floods.	Not needed.
26----- Oldsmar	Severe: seepage.	Severe: seepage, piping, erodes easily.	Severe: slow refill.	Cutbanks cave--	Fast intake, wetness.	Not needed.
27----- Ona	Severe: seepage.	Severe: seepage, unstable fill, piping.	Slight-----	Cutbanks cave, poor outlets.	Wetness-----	Not needed.
28----- Paola	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Not needed-----	Droughty, fast intake, soil blowing.	Not needed.
29----- Parkwood	Severe: seepage.	Severe: thin layer, seepage, piping.	Moderate: deep to water.	Cutbanks cave, floods.	Wetness-----	Not needed.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
30----- Pineda	Severe: seepage.	Moderate: seepage, thin layer, unstable fill.	Moderate: deep to water.	Cutbanks cave, percs slowly.	Wetness, percs slowly.	Not needed.
31*. Pits						
32----- Placid	Severe: seepage.	Severe: seepage, piping.	Slight-----	Ponding, cutbanks cave, poor outlets.	Wetness, floods.	Not needed.
33----- Placid Variant	Severe: seepage.	Severe: seepage, erodes easily.	Moderate: deep to water.	Cutbanks cave--	Fast intake, wetness.	Not needed.
34----- Pomello	Severe: seepage.	Severe: seepage, piping, unstable fill.	Moderate: deep to water.	Not needed----	Fast intake, droughty.	Not needed.
35----- Pomona	Severe: seepage.	Severe: seepage, piping, wetness.	Slight-----	Cutbanks cave--	Wetness, droughty, fast intake.	Not needed.
36----- Pompano	Severe: seepage.	Severe: seepage, piping.	Slight-----	Cutbanks cave--	Wetness-----	Not needed.
37----- Pompano	Severe: seepage.	Severe: seepage, piping.	Slight-----	Ponding, cutbanks cave, poor outlets.	Wetness, ponding.	Not needed.
38----- Riviera	Severe: seepage.	Severe: thin layer, seepage.	Slight-----	Cutbanks cave, percs slowly.	Wetness, percs slowly.	Not needed.
39----- Riviera	Severe: seepage.	Severe: thin layer, seepage.	Slight-----	Poor outlets, cutbanks cave, ponding.	Wetness, percs slowly.	Not needed.
40----- Samsula	Severe: seepage.	Severe: excess humus, wetness.	Slight-----	Excess humus, poor outlets.	Favorable----	Not needed.
41----- Satellite	Severe: seepage.	Severe: seepage, piping, unstable fill.	Moderate: deep to water.	Cutbanks cave--	Droughty, too sandy, fast intake.	Not needed.
42----- Smyrna	Severe: seepage.	Severe: seepage, piping, unstable fill.	Slight: favorable.	Cutbanks cave--	Wetness-----	Not needed.
43----- St. Lucie	Severe: seepage.	Severe: seepage, piping, unstable fill.	Severe: no water.	Not needed----	Droughty, too sandy, fast intake.	Not needed.
44----- Tavares	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Not needed----	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
45----- Vero	Slight: seepage.	Severe: wetness.	Severe: slow refill.	Cutbanks cave, percs slowly.	Wetness, percs slowly.	Not needed.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
46----- Wauchula	Severe: seepage.	Severe: seepage, unstable fill.	Moderate: deep to water.	Cutbanks cave--	Fast intake, wetness.	Not needed.
47----- Winder	Slight: seepage.	Slight-----	Severe: slow refill.	Floods, percs slowly.	Floods, wetness, percs slowly.	Not needed.

* See map unit description for the composition and behavior of the map unit.

TABLE 13.--RECREATIONAL DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1----- Adamsville	Moderate: too sandy, wetness.	Moderate: too sandy, wetness.	Severe: too sandy.	Moderate: too sandy, wetness.
2----- Adamsville Variant	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
3----- Ankona	Severe: wetness, percs slowly.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.
4*. Arents				
5----- Basinger	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
6----- Basinger	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.
7----- Candler	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
8----- Candler	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, slope.	Severe: too sandy.
9----- Cassia	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
10----- Delray	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.
11----- EauGallie	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
12----- Floridana	Severe: wetness, ponding, percs slowly.	Severe: wetness, ponding.	Severe: wetness, ponding, percs slowly.	Severe: wetness, ponding.
13----- Gentry	Severe: floods, wetness, percs slowly.	Severe: wetness, too sandy, floods.	Severe: wetness, too sandy, floods, percs slowly.	Severe: wetness, too sandy, floods.
14----- Holopaw	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.
15----- Hontoon	Severe: excess humus, wetness.	Severe: excess humus, wetness.	Severe: excess humus, wetness.	Severe: excess humus, wetness.
16----- Immokalee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
17----- Kaliga	Severe: wetness, excess humus, percs slowly.	Severe: wetness, excess humus.	Severe: excess humus, wetness, percs slowly.	Severe: wetness, excess humus.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
18----- Lokosee	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.
19----- Malabar	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
20----- Malabar	Severe: ponding, wetness.	Severe: ponding, wetness.	Severe: wetness, ponding.	Severe: wetness, ponding.
21*: Malabar-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pineda-----	Severe: wetness, too sandy, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
22----- Myakka	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
23*: Myakka-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.				
24----- Narcoossee	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
25----- Nittaw	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus, floods.	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus, floods.
26----- Oldsmar	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.
27----- Ona	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
28----- Paola	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, soil blowing.	Severe: too sandy.
29----- Parkwood	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
30----- Pineda	Severe: wetness, too sandy, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
31*. Pits				
32----- Placid	Severe: ponding, wetness.	Severe: ponding, wetness.	Severe: wetness, ponding.	Severe: wetness, ponding.
33----- Placid Variant	Moderate: wetness.	Moderate: wetness.	Severe: too sandy.	Severe: too sandy.
34----- Pomello	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, slope.	Severe: too sandy.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
35----- Pomona	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.
36----- Pompano	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.
37----- Pompano	Severe: ponding, wetness, too sandy.	Severe: ponding, wetness, too sandy.	Severe: wetness, too sandy, ponding.	Severe: wetness, too sandy, ponding.
38----- Riviera	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
39----- Riviera	Severe: wetness, ponding, percs slowly.	Severe: wetness, ponding.	Severe: wetness, ponding, percs slowly.	Severe: wetness, ponding.
40----- Samsula	Severe: excess humus, wetness.	Severe: excess humus, wetness.	Severe: excess humus, wetness.	Severe: excess humus, wetness.
41----- Satellite	Severe: too sandy, wetness.	Severe: too sandy.	Severe: too sandy, soil blowing, wetness.	Severe: too sandy.
42----- Smyrna	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
43----- St. Lucie	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, soil blowing.	Severe: too sandy.
44----- Tavares	Moderate: too sandy.	Moderate: too sandy.	Severe: too sandy.	Moderate: too sandy.
45----- Vero	Severe: wetness, too sandy, percs slowly.	Severe: wetness, too sandy.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.
46----- Wauchula	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
47----- Winder	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.

* See map unit description for the composition and behavior of the map unit.

TABLE 14.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1----- Adamsville	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor.
2----- Adamsville Variant	Poor	Poor	Poor	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
3----- Ankona	Poor	Fair	Fair	Poor	Fair	Poor	Poor	Fair	Fair	Poor.
4*. Arents										
5----- Basinger	Poor	Poor	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair.
6----- Basinger	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
7, 8----- Candler	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
9----- Cassia	Very poor.	Poor	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
10----- Delray	Very poor.	Poor	Poor	Poor	Very poor.	Good	Good	Poor	Poor	Good.
11----- EauGallie	Poor	Poor	Poor	Poor	Poor	Poor	Very poor.	Poor	Poor	Poor.
12----- Floridana	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
13----- Gentry	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good.
14----- Holopaw	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
15----- Hontoon	Very poor.	Very poor.	Poor	Fair	Very poor.	Good	Good	Very poor.	Fair	Good.
16----- Immokalee	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor
17----- Kaliga	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good.
18----- Lokosee	Poor	Fair	Fair	Fair	Fair	Poor	Poor	---	Fair	Poor.
19----- Malabar	Poor	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair.
20----- Malabar	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good.
21*: Malabar-----	Poor	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair.
Pineda-----	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair.

See footnote at end of table.

SOIL SURVEY

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
22----- Myakka	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
23*: Myakka----- Urban land.	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
24----- Narcoossee	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor.
25----- Nittaw	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good.
26----- Oldsmar	Poor	Fair	Fair	Poor	Fair	Poor	Poor	Fair	Fair	Poor.
27----- Ona	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
28----- Paola	Poor	Poor	Fair	Very poor.	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
29----- Parkwood	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
30----- Pineda	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair.
31*. Pits										
32----- Placid	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Good	Good	Very poor.	Very poor.	Good.
33----- Placid Variant	Poor	Poor	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
34----- Pomello	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
35----- Pomona	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
36----- Pompano	Poor	Fair	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair.
37----- Pompano	Very poor.	Very poor.	Poor	Poor	Poor	Good	Good	Very poor.	Poor	Good.
38----- Riviera	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Fair.
39----- Riviera	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
40----- Samsula	Very poor.	Very poor.	Poor	Fair	Very poor.	Good	Good	Very poor.	Poor	Good.
41----- Satellite	Very poor.	Poor	Poor	Poor	Poor	Poor	Very poor.	Poor	Poor	Very poor.
42----- Smyrna	Poor	Fair	Fair	Poor.	Fair	Fair	Fair	Fair	Fair	Fair.

See footnote at end of table.

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
43----- St. Lucie	Poor	Poor	Fair	Very poor.	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
44----- Tavares	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
45----- Vero	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair	Poor.
46----- Wauchula	Poor	Poor	Poor	Poor	Poor	Poor	Very poor.	Poor	Poor	Poor.
47----- Winder	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.

* See map unit description for the composition and behavior of the map unit.

SOIL SURVEY

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means greater than. Absence of an entry means data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1----- Adamsville	0-4	Sand-----	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	4-80	Fine sand, sand	SP-SM, SP	A-3, A-2-4	0	100	100	90-100	2-12	---	NP
2----- Adamsville Variant	0-33	Fine sand-----	SP, SP-SM	A-3	0	100	100	80-95	2-10	---	NP
	33-49	Muck-----	PT	---	---	---	---	---	---	---	---
	49-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	80-95	2-10	---	NP
3----- Ankona	0-32	Fine sand-----	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	32-47	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-25	---	NP
	47-80	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	85-95	20-35	25-40	4-18
4*. Arents											
5, 6----- Basinger	0-80	Fine sand-----	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	<40	NP-3
7, 8----- Candler	0-62	Sand-----	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
	62-80	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	95-100	75-100	5-12	---	NP
9----- Cassia	0-20	Fine sand-----	SP, SP-SM	A-3	0	100	100	90-100	2-7	---	NP
	20-28	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-20	---	NP
	28-88	Sand, fine sand	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
10----- Delray	0-14	Loamy fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	<20	NP-5
	14-44	Fine sand, sand	SP-SM	A-3, A-2-4	0	100	100	95-100	5-12	---	NP
	44-62	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	95-100	20-35	<40	NP-15
	62-80	Loamy fine sand, loamy sand.	SM	A-2-4	0	100	100	95-100	13-20	<20	NP-5
11----- EauGallie	0-23	Fine sand-----	SP, SP-SM	A-3	0	100	100	80-98	2-5	---	NP
	23-34	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-98	5-20	---	NP
	34-54	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-98	2-12	---	NP
	54-82	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	80-98	20-35	<40	NP-20
12----- Floridana	0-15	Fine sand-----	SP-SM, SM	A-3, A-2-4	0	100	100	80-90	5-25	---	NP
	15-24	Fine sand, sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	24-48	Sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	85-95	20-35	20-30	7-16
	48-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
13----- Gentry	0-24	Fine sand-----	SP, SP-SM, SM	A-3, A-2-4	0	100	100	70-100	2-20	---	NP
	24-64	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	60-100	20-35	<30	NP-16
	64-80	Sand, loamy fine sand, fine sandy loam.	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-25	---	NP
14----- Holopaw	0-47	Fine sand-----	SP, SP-SM	A-3	0	100	95-100	70-95	2-10	---	NP
	47-60	Sandy loam, sandy clay loam.	SM, SM-SC	A-2-4	0	100	95-100	70-99	15-30	<25	NP-7
	60-80	Loamy sand-----	SM	A-2-4	0	100	95-100	70-99	13-20	---	NP
15----- Hontoon	0-70	Muck-----	PT	---	0	---	---	---	---	---	---
16----- Immokalee	0-7	Fine sand-----	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
	7-37	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
	37-47	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-21	---	NP
	47-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
17----- Kaliga	0-26	Muck-----	PT	---	---	---	---	---	---	---	---
	26-37	Loam, fine sandy loam, loamy sand.	SM, SM-SC	A-2-4, A-2-6, A-4, A-6	0	100	100	90-100	13-50	<40	NP-15
	37-65	Sandy clay, clay, sandy clay loam.	SC, CL, CH	A-7, A-4, A-6	0	100	100	75-100	36-85	20-73	8-40
	65-80	Fine sandy loam, sandy loam, loamy sand.	SM, SM-SC, SC	A-2-4	0	100	100	75-100	13-35	<28	NP-7
18----- Lokosee	0-27	Fine sand-----	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	27-35	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	3-12	---	NP
	35-43	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	43-49	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	49-57	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	85-100	20-35	<35	NP-14
19, 20----- Malabar	0-18	Fine sand-----	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	18-38	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-90	3-12	---	NP
	38-50	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	50-80	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	80-90	22-40	20-40	4-15
21*: Malabar-----	0-18	Fine sand-----	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	18-38	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-90	3-12	---	NP
	38-50	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	50-80	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	80-90	22-40	20-40	4-15

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
21*: Pineda-----	0-28	Fine sand-----	SP, SP-SM	A-3	0	100	100	80-95	2-5	---	NP
	28-80	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	100	100	80-95	15-35	20-30	4-12
22----- Myakka	0-27	Fine sand-----	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	27-37	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	37-82	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
23*: Myakka-----	0-27	Fine sand-----	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	27-37	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	37-82	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
Urban land.											
24----- Narcoossee	0-5	Fine sand-----	SP-SM	A-3	0	100	100	95-100	5-10	---	NP
	5-22	Sand, fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-8	---	NP
	22-26	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	95-100	5-12	---	NP
	26-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-8	---	NP
25----- Nittaw	7-0	Muck-----	PT	---	---	---	---	---	---	---	---
	0-8	Sand, fine sand, mucky fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	8-64	Sandy clay, clay	CH, CL	A-7	0	100	100	85-100	51-70	40-80	21-50
	64-76	Sand, fine sand, fine sandy loam.	SP, SP-SM, SM, SM-SC	A-3, A-2-4	0	100	100	85-100	4-25	<28	NP-7
26----- Oldsmar	0-43	Fine sand-----	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-10	---	NP
	43-67	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	80-100	5-20	---	NP
	67-80	Fine sandy loam, sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	85-100	20-35	20-35	5-15
27----- Ona	0-6	Fine sand-----	SP-SM, SP	A-3	0	100	100	85-95	3-10	---	NP
	6-15	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-20	---	NP
	15-80	Fine sand, sand	SP-SM, SP	A-3	0	100	100	85-95	3-10	---	NP
28----- Paola	0-16	Sand-----	SP	A-3	0	100	100	85-100	1-2	---	NP
	16-80	Sand, fine sand	SP	A-3	0	100	100	80-100	1-4	---	NP
29----- Parkwood	0-7	Loamy fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	3-7	---	NP
	7-35	Fine sandy loam, sandy loam.	SM, SM-SC	A-2-4	0	100	97-100	80-95	20-35	<28	NP-7
	35-60	Fine sand, loamy fine sand.	SM	A-2-4	0	100	88-97	85-95	13-25	---	NP
30----- Pineda	0-28	Fine sand-----	SP, SP-SM	A-3	0	100	100	80-95	2-5	---	NP
	28-80	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	100	100	80-95	15-35	20-30	4-12

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth In	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
31*. Pits											
32----- Placid	0-24	Fine sand-----	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	1-20	---	NP
	24-80	Fine sand, sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	1-20	---	NP
33----- Placid Variant	0-17	Fine sand-----	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	17-80	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
34----- Pomello	0-47	Fine sand-----	SP, SP-SM	A-3	0	100	100	60-100	1-8	---	NP
	47-58	Coarse sand, sand, fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	60-100	6-15	---	NP
	58-80	Coarse sand, sand, fine sand.	SP, SP-SM	A-3	0	100	100	60-100	4-10	---	NP
35----- Pomona	0-24	Fine sand-----	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	24-32	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-15	---	NP
	32-69	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	69-78	Sandy clay loam, sandy loam, sandy clay.	SC, SM-SC	A-2, A-4, A-6	0	100	95-100	85-100	25-50	25-40	4-16
36, 37----- Pompano	0-80	Fine sand-----	SP, SP-SM	A-3, A-2-4	0	100	100	75-100	1-12	---	NP
38, 39----- Riviera	0-24	Fine sand-----	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	4-12	---	NP
	24-38	Sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4	0	100	100	80-100	15-35	<35	NP-10
	38-61	Sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	80-100	20-35	20-40	4-20
	61-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-1	0	60-80	50-75	40-70	3-10	---	NP
40----- Samsula	0-22	Muck-----	PT	---	---	---	---	---	---	---	---
	22-65	Sand, fine sand, loamy sand.	SP-SM, SM, SP	A-3, A-2-4	0	100	100	80-100	2-20	<40	NP-10
41----- Satellite	0-80	Sand-----	SP, SW	A-3	0	100	100	60-95	1-5	---	NP
42----- Smyrna	0-14	Fine sand-----	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	14-25	Sand, fine sand	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
	25-56	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	56-80	Sand, fine sand	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
43----- St. Lucie	0-80	Fine sand-----	SP	A-3	0	100	100	85-99	1-5	---	NP
44----- Tavares	0-80	Fine sand-----	SP, SP-SM	A-3	0	100	95-100	85-100	2-8	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	<u>In</u>				<u>Pct</u>					<u>Pct</u>	
45----- Vero	0-21	Fine sand-----	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-25	---	NP
	21-28	Sand, fine sand, loamy fine sand.	SM	A-2-4	0	100	100	70-100	13-25	---	NP
	28-62	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6, A-6, A-4	0	100	100	60-100	30-50	<40	NP-25
	62-99	Fine sandy loam, loamy fine sand, loamy sand.	SM, SM-SC, SC	A-2-4, A-2-6, A-6, A-4	0	100	100	70-100	13-40	<40	NP-15
46----- Wauchula	0-28	Fine sand-----	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	28-37	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	8-25	---	NP
	37-41	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	41-82	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6, A-4, A-6	0	100	92-100	90-100	25-50	<40	NP-20
47----- Winder	0-14	Loamy fine sand	SM, SM-SC	A-2-4	0	100	100	80-100	12-25	---	NP
	14-34	Sandy clay loam	SM-SC, SC	A-2-4, A-2-6	0	100	100	80-100	18-35	20-40	11-26
	34-52	Sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4	0	60-80	50-75	40-70	15-35	<35	NP-20
	52-80	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	60-80	50-75	40-70	3-20	<35	NP

* See map unit description for the composition and behavior of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means greater than. The erosion tolerance factor (T) is for the entire profile. Wind erodibility group is for the surface layer. Absence of an entry means data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
							K	T	
	In	In/hr	In/in	pH	Mmhos/cm				
1----- Adamsville	0-4 4-80	6.0-20 6.0-20	0.03-0.10 0.03-0.08	4.5-7.8 4.5-7.8	<2 <2	Very low Very low	0.17 0.17	5	2
2----- Adamsville Variant	0-33 33-49 49-80	6.0-20 0.6-20 6.0-20	0.02-0.05 0.20-0.25 0.02-0.05	4.5-6.5 4.5-6.5 4.5-6.5	<2 <2 <2	Low----- Low----- Low-----	0.17 0.17 0.17	5	2
3----- Ankona	0-32 32-47 47-80	6.0-20 <0.2 0.6-6.0	0.02-0.05 0.10-0.15 0.13-0.17	3.6-5.5 3.6-5.5 3.6-5.5	<2 <2 <2	Low----- Low----- Low-----	0.28 0.28 0.43	5	2
4*. Arents									
5, 6----- Basinger	0-80	>20	0.03-0.07	4.5-6.5	<2	Very low	0.10	5	2
7, 8----- Candler	0-62 62-80	>20 6.0-20	0.02-0.05 0.05-0.08	4.5-6.0 4.5-6.0	<2 <2	Very low Very low	0.10 0.10	5	2
9----- Cassia	0-20 20-28 28-88	6.0-20 0.6-6.0 6.0-20	0.03-0.05 0.10-0.15 0.03-0.05	4.5-6.0 4.5-5.5 4.5-5.5	<2 <2 <2	Low----- Low----- Low-----	0.15 0.20 0.15	5	2
10----- Delray	0-14 14-44 44-62 62-80	6.0-20 6.0-20 0.6-6.0 2.0-6.0	0.10-0.15 0.05-0.08 0.10-0.15 0.07-0.10	5.6-7.3 6.1-7.3 6.6-7.8 7.4-7.8	<2 <2 <2 <2	Low----- Low----- Low----- Low-----	0.17 0.17 0.24 0.17	5	2
11----- EauGallie	0-23 23-34 34-54 54-82	6.0-20 0.6-6.0 6.0-20 0.6-6.0	0.02-0.05 0.05-0.10 0.02-0.05 0.10-0.15	4.5-5.5 5.1-6.0 5.6-7.8 5.6-7.8	<2 <2 <2 <2	Low----- Low----- Low----- Low-----	0.17 0.20 0.17 0.32	5	2
12----- Floridana	0-15 15-24 24-48 48-80	6.0-20 6.0-20 <0.2 6.0-20	0.10-0.15 0.05-0.10 0.10-0.15 0.02-0.05	5.6-8.4 5.6-8.4 5.6-8.4 5.6-8.4	<2 <2 <2 <2	Very low Very low Low----- Very low--	0.17 0.32 0.20 0.17	5	2
13----- Gentry	0-24 24-64 64-80	6.0-20 <0.2 0.6-20	0.10-0.15 0.10-0.20 0.05-0.10	5.1-7.3 5.6-8.4 6.1-8.4	<2 <2 <2	Low----- Low----- Low-----	0.20 0.32 0.24	5	2
14----- Holopaw	0-47 47-60 60-80	6.0-20 2.0-6.0 6.0-20	0.03-0.05 0.10-0.15 0.05-0.10	5.1-6.5 6.1-8.4 6.6-8.4	<2 <2 <2	Very low Low----- Very low	0.15 0.20 0.17	5	2
15----- Hontoon	0-70	6.0-20	0.20-0.25	<4.5	<2	Low-----	---	---	2
16----- Immokalee	0-7 7-37 37-47 47-80	6.0-20 6.0-20 0.6-6.0 6.0-20	0.05-0.08 0.02-0.05 0.10-0.15 0.02-0.05	4.5-5.5 4.5-5.5 4.5-5.5 4.5-5.5	<2 <2 <2 <2	Low----- Low----- Low----- Low-----	0.15 0.15 0.20 0.15	5	2
17----- Kaliga	0-26 26-37 37-65 65-80	6.0-20 0.6-6.0 <0.2 2.0-20	0.20-0.25 0.10-0.15 0.10-0.20 0.10-0.15	3.6-4.4 4.5-6.5 4.5-6.5 4.5-6.5	<2 <2 <2 <2	Very low Moderate High----- Low-----	--- 0.43 0.32 0.32	---	2

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodibility group
							K	T	
	In	In/hr	In/in	pH	Mmhos/cm				
18----- Lokosee	0-27	6.0-20	0.02-0.08	4.5-7.3	<2	Low-----	0.20	5	2
	27-35	6.0-20	0.05-0.10	5.6-8.4	<2	Low-----	0.20		
	35-43	0.6-6.0	0.05-0.10	5.6-8.4	<2	Low-----	0.20		
	43-49	6.0-20	0.02-0.08	6.1-8.4	<2	Low-----	0.20		
	49-57	0.6-6.0	0.10-0.15	6.1-8.4	<2	Low-----	0.32		
19, 20----- Malabar	0-18	6.0-20	0.03-0.08	5.6-7.3	<2	Low-----	0.20	5	2
	18-38	6.0-20	0.05-0.10	5.6-7.3	<2	Low-----	0.20		
	38-50	6.0-20	0.02-0.05	6.6-8.4	<2	Low-----	0.20		
	50-80	<0.2	0.10-0.15	6.6-8.4	<2	Low-----	0.32		
21*: Malabar-----	0-18	6.0-20	0.03-0.08	5.6-7.3	<2	Low-----	0.20	5	2
	18-38	6.0-20	0.05-0.10	5.6-7.3	<2	Low-----	0.20		
	38-50	6.0-20	0.02-0.05	6.6-8.4	<2	Low-----	0.20		
	50-80	<0.2	0.10-0.15	6.6-8.4	<2	Low-----	0.32		
Pineda-----	0-28	6.0-20	0.02-0.05	5.6-6.5	<2	Low-----	0.17	5	2
	28-80	<0.2	0.10-0.15	6.6-7.8	<2	Low-----	0.24		
22----- Myakka	0-27	6.0-20	0.02-0.05	3.6-5.5	---	Low-----	0.20	5	2
	27-37	0.6-6.0	0.10-0.15	3.6-5.5	---	Low-----	0.20		
	37-82	6.0-20	0.02-0.05	3.6-5.5	---	Low-----	0.17		
23*: Myakka-----	0-27	6.0-20	0.02-0.05	3.6-5.5	---	Low-----	0.20	5	2
	27-37	0.6-6.0	0.10-0.15	3.6-5.5	---	Low-----	0.20		
	37-82	6.0-20	0.02-0.05	3.6-5.5	---	Low-----	0.17		
Urban land.									
24----- Narcoossee	0-5	6.0-20	0.03-0.08	3.6-6.0	<2	Low-----	0.17	5	2
	5-22	6.0-20	0.02-0.05	3.6-6.0	<2	Low-----	0.17		
	22-26	2.0-6.0	0.05-0.08	3.6-6.0	<2	Low-----	0.17		
	26-80	6.0-20	0.02-0.05	3.6-6.0	<2	Low-----	0.17		
25----- Nittaw	7-0	6.0-20	0.20-0.25	3.6-4.4	<2	Low-----	---	---	2
	0-8	6.0-20	0.05-0.15	5.6-7.3	<2	Low-----	0.20		
	8-64	0.06-0.2	0.15-0.18	6.6-8.4	<2	High-----	0.37		
	64-76	6.0-20	0.05-0.10	6.6-8.4	<2	Low-----	0.37		
26----- Oldsmar	0-43	6.0-20	0.02-0.05	3.6-6.5	<2	Very low	0.20	5	2
	43-67	0.2-6.0	0.10-0.15	5.1-6.5	<2	Low-----	0.20		
	67-80	<0.2	0.10-0.15	5.6-8.4	<2	Low-----	0.24		
27----- Ona	0-6	6.0-20	0.10-0.15	4.5-6.0	<2	Low-----	0.20	5	2
	6-15	0.6-2.0	0.10-0.15	4.5-6.0	<2	Low-----	0.20		
	15-80	6.0-20	0.03-0.08	4.5-6.0	<2	Low-----	0.15		
28----- Paola	0-16	>20	0.02-0.05	4.5-5.5	<2	Very low	0.15	5	1
	16-80	>20	0.02-0.05	4.5-5.5	<2	Very low	0.15		
29----- Parkwood	0-7	>20	0.05-0.11	6.6-7.8	<2	Low-----	0.20	5	2
	7-35	2.0-6.0	0.10-0.14	7.4-8.4	<2	Low-----	0.24		
	35-60	6.0-20	0.05-0.11	7.4-8.4	<2	Low-----	0.17		
30----- Pineda	0-28	6.0-20	0.02-0.05	5.6-6.5	<2	Low-----	0.17	5	2
	28-80	<0.2	0.10-0.15	6.6-7.8	<2	Low-----	0.24		
31*. Pits									
32----- Placid	0-24	6.0-20	0.15-0.20	3.6-5.5	<2	Very low	0.17	5	2
	24-80	6.0-20	0.05-0.08	4.5-6.5	<2	Very low	0.17		
33----- Placid Variant	0-17	6.0-20	0.15-0.20	3.6-5.5	<2	Low-----	0.17	5	2
	17-80	6.0-20	0.05-0.08	4.5-5.5	<2	Low-----	---		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
							K	T	
	In	In/hr	In/in	pH	Mmhos/cm				
34----- Pomello	0-47 47-58 58-80	>20 2.0-6.0 6.0-20	0.02-0.05 0.10-0.15 0.02-0.05	4.5-5.5 4.5-5.5 4.5-5.5	<2 <2 <2	Very low Very low Very low	0.17 0.20 0.17	5	1
35----- Pomona	0-24 24-32 32-69 69-78	6.0-20 0.6-2.0 6.0-20 0.6-2.0	0.03-0.08 0.10-0.15 0.03-0.08 0.13-0.17	3.6-5.5 3.6-5.5 3.6-5.5 3.6-5.5	<2 <2 <2 <2	Low----- Low----- Low----- Low-----	0.20 0.20 0.20 0.32	5	2
36, 37----- Pompano	0-80	>20	0.02-0.05	5.1-7.8	<2	Very low	0.17	5	2
38, 39----- Riviera	0-24 24-38 38-61 61-80	6.0-20 6.0-20 <0.2 0.6-6.0	0.05-0.08 0.10-0.14 0.12-0.15 0.05-0.08	4.5-6.5 6.1-8.4 6.6-8.4 7.9-8.4	<2 <2 <2 <2	Low----- Low----- Low----- Low-----	0.17 0.28 0.28 0.15	4	2
40----- Samsula	0-22 22-65	6.0-20 6.0-20	0.20-0.25 0.02-0.05	<4.5 3.6-6.0	<2 <2	Low----- Low-----	--- ---	---	2
41----- Satellite	0-80	>20	0.02-0.05	4.5-6.5	<2	Very low	0.15	5	2
42----- Smyrna	0-14 14-25 25-56 56-80	6.0-20 0.6-6.0 6.0-20 0.6-6.0	0.03-0.07 0.10-0.15 0.03-0.07 0.10-0.15	3.6-7.3 3.6-7.3 4.5-5.5 4.5-6.0	<2 <2 <2 <2	Low----- Low----- Low----- Low-----	0.20 0.20 0.17 0.20	5	2
43----- St. Lucie	0-80	>20	0.02-0.05	3.6-5.5	<2	Very low	0.15	5	1
44----- Tavares	0-80	>20	0.02-0.05	4.5-5.5	<2	Very low	0.17	5	2
45----- Vero	0-21 21-28 28-62 62-99	6.0-20 <0.2 <0.2 0.2-2.0	0.03-0.08 0.10-0.15 0.10-0.15 0.05-0.10	3.6-5.5 4.5-6.5 5.6-8.4 7.4-8.4	<2 <2 <2 <2	Low----- Low----- Low----- Low-----	0.20 0.20 0.32 0.24	5	2
46----- Wauchula	0-28 28-37 37-41 41-82	6.0-20 0.6-6.0 6.0-20 0.6-6.0	0.08-0.15 0.11-0.17 0.05-0.10 0.11-0.17	3.6-5.5 3.6-5.5 4.5-5.5 4.5-5.5	<2 <2 <2 <2	Low----- Low----- Low----- Low-----	0.20 0.20 0.20 0.37	5	2
47----- Winder	0-14 14-34 34-52 52-80	6.0-20 <0.2 <0.2 0.6-2.0	0.06-0.10 0.10-0.15 0.06-0.12 0.03-0.06	5.6-6.5 7.4-8.4 7.4-8.4 7.4-8.4	<2 <2 <2 <2	Low----- Low----- Low----- Low-----	0.20 0.32 0.32 0.32	5	2

* See map unit description for the composition and behavior of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. See text for descriptions of symbols and such terms as "rare," "brief," and "perched." The symbol < means less than; > means greater than]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Initial	Total	Uncoated steel	Concrete
1----- Adamsville	C	None-----	---	---	2.0-3.5	Apparent	Jun-Nov	>60	---	In	In	Low-----	Moderate.
2----- Adamsville Variant	C	None-----	---	---	2.0-3.5	Apparent	Jun-Nov	>60	---	1-2	5-10	High-----	Moderate.
3----- Ankona	C/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	High.
4*----- Arents													
5----- Basinger	A/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	Moderate.
6----- Basinger	A/D	None-----	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	Moderate
7, 8----- Candler	A	None-----	---	---	>6.0	---	---	>60	---	---	---	Low-----	High.
9----- Cassia	C	None-----	---	---	1.5-3.5	Apparent	Jul-Jan	>60	---	---	---	Moderate	High.
10----- Delray	A/D	None-----	---	---	+2-1.0	Apparent	Jun-Mar	>60	---	---	---	Moderate	Low.
11----- EauGallie	B/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	Moderate.
12----- Floridana	A/D	None-----	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	Moderate	Low.
13----- Gentry	B/D	Common-----	Very long	Jun-Sep	+2-2.0	Apparent	Jun-Jan	>60	---	---	---	High-----	Moderate.
14----- Holopaw	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Moderate.
15----- Hontoon	A/D	None-----	---	---	+2-1.0	Apparent	Jan-Dec	>60	---	4-8	>52	High-----	High.
16----- Immokalee	A/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	High.
17----- Kaliga	A/D	None-----	---	---	+2-0	Apparent	Jun-Apr	>60	---	16-20	24-45	High-----	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Initial	Total	Uncoated steel	Concrete
18----- Lokosee	B/D	None-----	---	---	0-1.0	Apparent	Jul-Nov	>60	---	In	In	High-----	Low.
19----- Malabar	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Low.
20----- Malabar	B/D	None-----	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	Low.
21*----- Malabar	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Low.
Pineda-----	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Low.
22----- Myakka	A/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	High.
23*----- Myakka	A/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	High.
Urban land.													
24----- Narcoossee	C	None-----	---	---	2.0-3.5	Apparent	Jun-Nov	>60	---	---	---	Moderate	High.
25----- Nittaw	C/D	Common-----	Very long	Jun-Sep	+2-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
26----- Oldsmar	B/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	Moderate	High.
27----- Ona	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
28----- Paola	A	None-----	---	---	>6.0	---	---	>60	---	---	---	Low-----	High.
29----- Parkwood	A/D	Occasional	Brief-----	Jul-Nov	0-1.0	Apparent	Jun-Oct	>60	---	---	---	High-----	Low.
30----- Pineda	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Low.
31*----- Pits													
32----- Placid	A/D	None-----	---	---	+2-1.0	Apparent	Jun-Mar	>60	---	---	---	High-----	High.

See footnote at end of table.

SOIL SURVEY

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Initial	Total	Uncoated steel	Concrete
33----- Placid Variant	A/D	None-----	---	---	<u>Ft</u> 1.5-3.0	Apparent	Jul-Dec	>60	---	<u>In</u> ---	---	High-----	High.
34----- Pomello	C	None-----	---	---	2.0-3.5	Apparent	Jul-Nov	>60	---	---	---	Low-----	High.
35----- Pomona	B/D	None-----	---	---	0-1.0	Apparent	Jul-Sep	>60	---	---	---	High-----	High.
36----- Pompano	A/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Moderate.
37----- Pompano	A/D	None-----	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	Moderate.
38----- Riviera	B/D	None-----	---	---	0-1.0	Apparent	Jun-Dec	>60	---	---	---	High-----	High.
39----- Riviera	B/D	None-----	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	Moderate.
40----- Samsula	A/D	None-----	---	---	+2-1.0	Apparent	Jan-Dec	>60	---	16-20	30-36	High-----	High.
41----- Satellite	C	None-----	---	---	1.0-3.5	Apparent	Jun-Nov	>60	---	---	---	Low-----	Moderate.
42----- Smyrna	A/D	None-----	---	---	0-1.0	Apparent	Jul-Oct	>60	---	---	---	High-----	High.
43----- St. Lucie	A	None-----	---	---	>6.0	---	---	>60	---	---	---	Low-----	Moderate.
44----- Tavares	A	None-----	---	---	3.5-6.0	Apparent	Jun-Dec	>60	---	---	---	Low-----	High.
45----- Vero	B/D	None-----	---	---	0-1.0	Apparent	Jun-Oct	>60	---	---	---	Moderate	High.
46----- Wauchula	B/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	High.
47----- Winder	B/D	Frequent----	Long-----	Jul-Oct	0-1.0	Apparent	Jun-Dec	>60	---	---	---	High-----	Low.

* See map unit description for the composition and behavior of the map unit.

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS

Soil series and sample numbers	Depth	Horizon	Particle size distribution (Percent less than 2 mm)							Hydr. cond. (sat.) Cm/hr	Bulk density field moist G/cc	Water content			
			Sand					Silt (0.05- 0.002)	Clay <0.002			1/10 bar	1/3 bar	15 bar	
			Very coarse (2.0- 1.0)	Coarse (1.0- 0.5)	Medium (0.5- 0.25)	Fine (0.25- 0.1)	Very fine (0.1- 0.05)								Total (2.0- 0.05)
Adamsville:	In														
S49-17-1	0-4	A1	0.1	4.8	34.6	45.8	9.1	94.4	3.3	2.3	1.47	6.4	4.3	1.5	
S49-17-2	4-16	C1	0.1	5.2	35.9	45.7	9.4	96.3	1.9	1.8	1.53	4.2	2.6	0.8	
S49-17-3	16-33	C2	0.1	5.6	37.5	44.9	8.4	96.5	1.9	1.6	1.54	4.1	2.6	0.9	
S49-17-4	33-55	C3	0.1	6.2	36.8	46.7	8.3	98.1	0.1	1.8	1.61	2.8	1.8	0.8	
S49-17-5	55-80	C4	0.1	5.5	35.2	47.3	9.8	97.9	0.2	1.9	1.64	2.9	1.6	0.8	
Ankona:															
S49-32-1	0-5	A11	0.0	2.7	30.5	50.6	10.7	94.5	3.7	1.8	1.42	9.9	6.9	3.5	
S49-32-2	0-5	A12	0.0	2.7	31.4	52.6	10.0	96.7	2.2	1.1	1.45	6.2	4.2	2.1	
S49-32-3	9-14	A21	0.0	2.8	29.6	53.8	11.4	97.6	1.5	0.9	1.55	4.9	3.2	1.8	
S49-32-4	14-32	A22	0.0	3.2	28.3	54.7	11.5	97.7	1.2	1.1	1.54	5.2	3.6	1.4	
S49-32-5	32-36	B21h	0.1	2.9	23.8	46.3	10.6	83.7	8.7	7.6	1.73	17.1	13.2	4.9	
S49-32-6	36-40	B22h	0.1	2.9	26.5	46.5	9.2	85.2	6.5	8.3	1.51	16.7	14.3	6.4	
S49-32-7	40-47	B3&Bh	0.1	3.2	27.1	44.7	8.2	83.3	4.6	12.1	1.66	16.5	14.4	7.4	
S49-32-8	47-51	B21t	0.0	2.8	27.4	42.0	7.5	79.7	1.7	18.6	1.68	18.7	16.4	8.7	
S49-32-9	51-80	B22tg	0.0	3.1	28.2	39.5	6.2	77.0	1.4	21.6	1.77	16.8	15.1	8.3	
Candler:															
S49-5-1	0-3	A1	0.0	2.9	45.0	46.0	2.0	95.9	2.7	1.4	---	---	---	---	---
S49-5-2	3-6	A21	0.0	3.0	46.5	44.7	1.9	96.1	1.9	2.0	1.53	3.5	2.4	0.9	
S49-5-3	6-17	A22	0.0	3.0	46.3	45.4	1.8	96.5	1.6	1.9	1.55	2.9	2.0	0.9	
S49-5-4	17-35	A23	0.0	2.9	46.6	45.6	1.8	96.9	1.2	1.9	1.50	2.7	1.7	0.7	
S49-5-5	35-80	A24, A24&B	0.1	3.4	47.4	44.7	1.8	97.4	0.8	1.8	1.45	3.0	2.1	0.8	
Cassia:															
S49-11-1	0-3	A1	0.0	0.7	10.7	70.6	11.3	93.3	5.2	1.5	1.23	9.5	6.4	3.3	
S49-11-2	3-20	A2	0.0	0.9	12.5	72.4	12.4	98.2	1.3	0.5	1.45	4.2	2.9	1.4	
S49-11-3	20-22	B21h	0.0	0.9	8.9	64.6	11.3	85.7	6.7	7.6	1.35	22.6	17.2	3.3	
S49-11-4	22-28	B22h, B23h	0.0	0.8	9.6	70.1	10.1	90.6	5.8	3.6	1.43	45.1	11.7	4.0	
S49-11-5	28-53	A'2	0.0	1.2	10.0	74.1	12.0	97.3	1.4	1.3	1.54	6.5	4.0	1.0	
S49-11-6	53-65	B'21h	0.0	0.6	8.3	68.3	10.4	87.6	5.1	7.3	1.48	25.0	19.0	3.4	
S49-11-7	65-88	B'22h	0.0	0.6	8.3	72.3	10.7	91.9	4.8	3.3	---	---	---	---	---
Gentry:															
S49-21-1	0-7	A11	0.1	0.5	19.2	59.5	12.0	91.3	6.0	2.7	1.55	19.8	16.4	4.5	
S49-21-2	7-24	A12	0.1	2.6	25.0	59.0	11.5	98.2	1.5	0.3	1.47	20.2	17.7	8.9	
S49-21-3	24-37	B21t	0.0	0.4	15.2	53.4	11.9	80.9	3.6	15.5	1.61	21.8	19.8	10.0	
S49-21-4	37-64	B22t	0.1	0.5	17.4	53.5	11.4	82.9	1.0	16.1	1.59	22.6	17.2	12.8	
S49-21-5	64-80	C α	0.0	0.9	24.8	60.0	8.7	94.4	1.6	4.0	1.67	9.2	5.3	2.6	
Hontoon:															
S49-13-1	0-5	Oa1	---	---	---	---	---	---	---	---	0.17	393.6	316.0	52.4	
S49-13-2	5-17	Oa2	---	---	---	---	---	---	---	---	0.14	497.9	385.5	51.1	
S49-13-3	17-29	Oa2	---	---	Oa2	---	---	---	---	---	0.14	525.7	430.9	62.5	
S49-13-4	29-41	Oa3	---	---	---	---	---	---	---	---	0.11	704.6	522.4	66.9	
S49-13-5	41-52	Oa3	---	---	---	---	---	---	---	---	0.13	524.4	378.8	61.3	

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Particle size distribution (Percent less than 2 mm)							Hydr. cond. (sat.)	Bulk density field moist	Water content				
			Sand									Clay	1/10 bar	1/3 bar	15 bar	
			Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Total (2.0-0.05)	Silt (0.05-0.002)							
																<0.002
In								Cm/hr	G/cc	Pct (wt)						
Kaliga:																
S49-14-1	0-7	Oap										60.6	0.30	184.8	156.8	51.8
S49-14-2	7-17	Oa2										16.3	0.11	631.9	526.0	47.2
S49-14-3	17-26	Oa2										2.8	0.13	592.6	462.9	73.9
S49-14-4	26-32	IIC1														
S49-14-5	32-37	IIC2														
S49-14-6	37-45	IIC3														
S49-14-7	45-53	IIC3														
S49-14-8	53-65	IIC4														
S49-14-9	65-80	IVC5														
Lokosee:																
S49-28-1	0-4	A1														
S49-28-2	4-7	A21														
S49-28-3	7-27	A22														
S49-28-4	27-30	B11r														
S49-28-5	30-35	B21r														
S49-28-6	35-43	B'11r														
S49-28-7	43-49	A'2														
S49-28-8	49-57	B'2tg														
Myakka																
S49-10-1	0-7	A1														
S49-10-2	7-13	A2														
S49-10-3	13-27	A2														
S49-10-4	27-33	B21h														
S49-10-5	33-37	B22h														
S49-10-6	37-43	B3														
S49-10-7	43-70	A'2														
S49-10-8	70-82	B'23h														
Oldsmar:																
S49-30-1	0-6	A1														
S49-30-2	6-11	A21														
S49-30-3	11-27	A22														
S49-30-4	27-43	A22														
S49-30-5	43-48	B21h														
S49-30-6	48-54	B22h														
S49-30-7	54-63	B3&Bh														
S49-30-8	63-67	A'2														
S49-30-9	67-77	B'21tg														
S49-30-10	77-80	B'22tg														
Paola:																
S49-6-1	0-3	A1														
S49-6-2	3-6	A21														
S49-6-3	6-16	A22														
S49-6-4	16-25	B&A22														
S49-6-5	25-43	B&A22														
S49-6-6	43-80	B														

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Particle size distribution (Percent less than 2 mm)						Hydr. cond. (sat.) Cm/hr	Bulk density field moist G/cc	Water content				
			Sand					Clay			1/10 bar	1/3 bar	15 bar		
			Very coarse (2.0- 1.0)	Coarse (1.0- 0.5)	Medium (0.5- 0.25)	Fine (0.25- 0.1)	Very fine (0.1- 0.05)							Total (2.0- 0.05)	
<u>In</u>															
Placid:	S49-24-1	0-14	A11	0.0	0.1	2.1	74.6	12.7	89.5	6.6	3.9	1.28	30.0	22.6	5.9
	S49-24-2	14-24	A12	0.0	0.2	2.2	77.9	14.4	94.7	3.6	1.7	1.57	14.6	9.8	2.6
	S49-24-3	24-36	C1	0.0	0.2	2.5	82.1	13.3	98.1	1.4	0.5	1.49	11.6	6.1	1.7
	S49-24-4	36-50	C2	0.0	0.2	1.9	82.6	13.6	98.3	1.1	0.6	1.58	8.1	3.8	1.1
	S49-24-5	50-80	C3	0.0	0.1	1.8	83.7	13.0	98.6	0.9	0.5	1.56	4.3	2.8	1.4
Samsula:	S49-19-1	0-8	Oa1	---	---	---	---	---	---	---	---	0.19	415.7	368.1	41.1
	S49-19-2	8-14	Oa2	---	---	---	---	---	---	---	---	0.13	554.5	448.4	40.0
	S49-19-3	14-22	Oa2	---	---	---	---	---	---	---	---	0.23	334.3	272.7	28.1
	S49-19-4	22-39	IIAb	0.0	0.5	11.0	73.9	5.3	90.7	3.4	5.9	1.20	39.3	30.3	4.2
	S49-19-5	39-65	IIcB	0.0	2.1	15.4	65.8	13.9	97.2	2.0	0.8	1.55	7.5	4.8	1.0
Satellite:	S49-9-1	0-8	A	0.1	3.3	52.3	40.9	1.9	98.5	1.2	0.3	1.46	2.6	2.2	1.0
	S49-9-2	8-20	C1	0.1	4.7	49.9	42.1	2.3	99.1	0.5	0.4	1.47	2.4	2.1	1.2
	S49-9-3	20-30	C2	0.1	4.7	49.7	42.6	2.0	98.1	0.5	0.4	1.51	2.6	2.1	1.1
	S49-9-4	30-48	C3	0.0	4.9	48.4	43.7	1.9	98.9	1.1	0.0	1.55	2.9	2.0	1.2
	S49-9-5	48-80	C4	0.1	4.7	45.0	47.0	1.8	98.6	0.8	0.6	1.60	5.9	4.3	1.0
Smyrna:	S49-29-1	0-4	A11	0.0	1.6	26.7	54.4	9.1	91.8	7.1	1.1	1.39	9.5	6.7	2.9
	S49-29-2	4-7	A12	0.0	1.9	28.0	55.2	9.9	95.0	3.9	1.1	1.33	6.0	3.4	1.3
	S49-29-3	7-14	A2	0.1	2.4	29.0	55.8	9.8	97.1	2.6	0.3	1.53	3.9	2.6	0.7
	S49-29-4	14-17	B21h	0.1	1.8	21.9	53.4	10.7	87.9	6.8	5.3	1.25	23.7	18.7	5.6
	S49-29-5	17-20	B22h	0.0	1.8	27.0	51.2	8.9	88.9	6.4	4.7	1.55	5.8	3.8	1.1
	S49-29-6	20-25	B3&Bh	0.1	1.9	24.5	58.0	10.1	94.6	2.9	2.5	1.37	9.8	7.6	2.4
	S49-29-7	25-43	A'21	0.1	2.0	24.8	59.8	11.0	97.2	1.8	1.0	1.58	3.4	2.1	0.4
	S49-29-8	43-56	A'22	0.1	2.2	22.5	57.5	10.3	92.6	4.0	3.4	1.68	9.5	6.6	1.3
	S49-29-9	56-69	A'21h	0.0	2.2	21.7	59.3	10.2	93.4	3.8	2.8	1.63	17.0	10.9	2.0
	S49-29-10	69-80	B'22h	0.1	2.5	22.6	55.2	8.3	88.7	7.2	4.1	1.57	14.3	10.4	3.0
St. Lucie:	S49-7-1	0-4	A	0.0	0.6	12.5	76.4	8.1	97.6	1.4	1.0	1.41	8.5	2.9	1.7
	S49-7-2	4-13	C1	0.0	0.6	12.7	76.4	7.6	97.3	1.7	1.0	1.41	3.1	2.5	1.8
	S49-7-3	13-28	C2	0.0	0.7	12.7	77.5	7.7	98.6	0.4	1.0	1.42	4.1	2.0	1.8
	S49-7-4	28-43	C3	0.1	0.8	12.1	76.5	8.4	97.9	1.2	0.9	1.45	2.5	2.1	1.8
	S49-7-5	43-80	C4	0.0	0.8	12.4	76.7	8.9	98.8	0.3	0.9	---	---	---	---

SOIL SURVEY

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Particle size distribution (Percent less than 2 mm)							Hydr. cond. (sat.) Cm/hr	Bulk density field moist G/cc	Water content			
			Sand					Silt (0.05- 0.002)	Clay (0.002)			1/10 bar	1/3 bar	15 bar	
			Very coarse (2.0- 1.0)	Coarse (1.0- 0.5)	Medium (0.5- 0.25)	Fine (0.25- 0.1)	Very fine (0.1- 0.05)								Total (2.0- 0.05)
<u>In</u>															
Vero:															
S49-16-1	0-7	A11	0.1	1.7	19.7	46.8	22.3	90.6	8.1	1.3	1.07	28.7	20.1	7.2	
S49-16-2	7-10	A12	0.0	1.8	18.5	46.8	26.4	93.5	5.0	1.5	---	---	---	---	
S49-16-3	10-21	A2	0.1	1.8	15.6	46.5	32.1	96.1	3.8	0.1	1.56	6.2	2.9	1.1	
S49-16-4	21-24	B21h	0.1	2.0	15.0	51.2	24.7	93.0	6.3	0.7	1.62	7.2	3.6	0.8	
S49-16-5	24-28	B22h	0.1	2.0	14.6	45.1	27.5	89.3	5.9	4.8	1.82	16.1	12.6	3.1	
S49-16-6	28-32	B21t	0.4	2.3	14.7	40.8	24.8	83.0	6.2	10.8	1.83	14.7	12.8	5.7	
S49-16-7	32-40	B22tg	0.2	1.4	12.6	31.3	19.6	65.1	3.4	31.5	---	---	---	---	
S49-16-8	40-48	B22tg	0.3	1.5	12.6	30.0	22.0	66.4	3.0	30.6	1.51	32.2	31.2	21.0	
S49-16-9	48-55	B23tg	0.1	1.3	11.9	31.5	23.7	68.5	2.9	28.6	---	---	---	---	
S49-16-10	55-62	B23tg	0.0	1.4	12.1	32.4	23.3	69.2	3.0	27.8	1.65	24.2	22.2	16.2	
S49-16-11	62-80	C1g	0.1	1.6	12.5	35.4	26.2	75.8	2.6	21.6	1.77	20.3	19.5	14.6	
S49-16-12	80-99	C2g	0.1	1.7	13.0	37.3	30.7	82.8	0.0	17.2	1.69	18.3	14.7	8.7	
Wauchula:															
S49-12-1	0-8	A1	0.2	2.6	18.3	42.2	27.5	90.8	7.8	1.4	1.5	9.0	5.3	1.9	
S49-12-2	8-11	A21	0.2	2.7	17.0	44.3	32.1	96.3	3.2	0.5	1.49	6.8	3.3	1.2	
S49-12-3	11-28	A22	0.1	4.0	17.6	45.4	29.9	97.0	2.5	0.5	1.61	11.2	8.2	1.1	
S49-12-4	28-33	B21h	0.2	2.7	13.8	40.2	26.8	83.7	6.4	9.9	1.37	29.4	23.1	6.6	
S49-12-5	33-37	B22h	0.3	3.1	14.3	35.9	27.0	80.6	10.3	9.1	1.52	18.5	15.8	5.2	
S49-12-6	37-41	A'2&Bh	---	---	---	---	---	---	---	---	1.73	17.7	15.3	7.3	
S49-12-7	41-54	B'2tg	3.0	0.3	15.6	32.3	26.9	78.1	1.1	20.8	1.55	18.4	14.4	7.4	
S49-12-8	54-82	C'g	0.2	2.8	14.9	36.0	25.8	79.7	1.3	19.0	1.72	19.7	17.6	9.2	

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS

Soil series and sample numbers	Depth	Horizon	Extractable bases					Extractable acidity	Cation exchange capacity	Base saturation	Organic carbon	pH			Pyrophosphate extractable		
			Ca	Mg	Na	K	Sum					H ₂ O (1:1)	CaCl ₂ (0.01M) (1:2)	KC1 (1N) (1:1)	C	Fe	A1
-----Meq/100g-----																	
-----Pct-----																	
-----Pct-----																	
Adamsville:																	
S49-17-1	0-4	A1	0.40	0.10	(*)	(*)	0.50	3.40	3.90	13	0.78	4.5	4.0	3.7	---	---	---
S49-17-2	4-16	C1	0.10	(*)	(*)	(*)	0.10	2.30	2.40	4	0.35	5.0	4.5	4.3	---	---	---
S49-17-3	16-33	C2	(*)	(*)	(*)	(*)	(*)	2.30	2.30	---	0.32	5.0	4.5	4.3	---	---	---
S49-17-4	33-55	C3	(*)	(*)	(*)	(*)	(*)	0.20	0.20	---	0.05	5.2	5.0	4.6	---	---	---
S49-17-5	55-80	C4	(*)	(*)	(*)	(*)	(*)	0.20	0.20	---	0.05	5.4	5.6	4.9	---	---	---
Ankona:																	
S49-32-1	0-5	A11	2.49	0.14	0.04	0.10	2.77	4.50	7.27	38	1.57	5.2	4.3	4.2	---	---	---
S49-32-2	5-9	A12	0.69	0.01	0.02	0.02	0.74	1.50	2.24	33	0.60	5.7	4.3	4.3	---	---	---
S49-32-3	9-14	A21	0.16	0.01	0.01	0.02	0.20	0.60	0.80	25	0.24	5.9	4.2	3.9	0.12	0.00	0.01
S49-32-4	14-32	A22	0.06	0.00	0.02	0.00	0.08	0.40	0.48	17	0.15	6.2	4.5	4.0	0.14	0.00	0.01
S49-32-5	32-36	B21h	0.22	0.47	0.20	0.04	0.93	27.30	28.23	3	3.40	4.0	3.2	3.0	2.92	0.01	0.18
S49-32-6	36-40	B22h	0.03	0.09	0.09	0.02	0.23	26.70	26.93	1	2.66	4.3	3.6	3.5	2.50	0.00	0.35
S49-32-7	40-47	B3&Bh	0.02	0.05	0.07	0.02	0.16	16.40	16.56	1	1.10	4.5	3.9	3.8	1.02	0.00	0.26
S49-32-8	47-51	B21t	0.04	0.15	0.10	0.01	0.30	9.90	10.20	3	0.46	4.6	3.9	3.8	---	---	---
S49-32-9	51-80	B22tg	0.20	0.24	0.10	0.01	0.55	8.00	8.55	6	0.31	4.9	4.0	3.8	---	---	---
Candler:																	
S49-11-1	0-3	A1	1.26	0.17	(*)	0.07	1.50	1.60	3.10	48	0.46	5.4	5.1	4.8	---	---	---
S49-11-2	3-6	A21	0.91	0.11	(*)	0.07	1.09	1.20	2.29	48	0.36	5.6	5.2	5.0	---	---	---
S49-11-3	6-17	A22	0.30	0.05	(*)	0.07	0.42	1.00	1.42	30	0.14	5.8	5.3	5.1	---	---	---
S49-11-4	17-35	A23	0.14	(*)	(*)	0.05	0.19	1.00	1.19	16	0.02	5.7	4.9	4.6	---	---	---
S49-11-5	35-80	A24, A24&B	0.05	(*)	(*)	0.11	0.16	1.20	1.36	12	0.02	5.5	4.6	4.6	---	---	---
Cassia:																	
S49-11-1	0-3	A1	1.20	0.20	(*)	(*)	1.40	7.70	9.10	15	1.96	4.4	3.5	3.2	---	---	---
S49-11-2	3-20	A2	0.10	(*)	(*)	(*)	0.10	0.20	0.30	33	0.13	5.4	4.2	4.1	---	---	---
S49-11-3	20-22	B21h	0.10	0.10	(*)	0.10	0.30	28.10	28.40	1	4.13	4.4	3.6	3.5	2.14	0.00	0.30
S49-11-4	22-28	B22h, B23h	0.10	0.10	(*)	0.10	0.30	24.70	25.00	1	2.34	4.3	3.9	3.8	1.82	0.00	0.40
S49-11-5	28-53	A'2	(*)	(*)	(*)	(*)	(*)	2.10	2.10	---	0.27	5.5	4.6	4.4	---	---	---
S49-11-6	53-65	B'21h	(*)	(*)	(*)	0.10	0.10	11.50	11.60	1	1.14	5.3	4.6	4.3	1.07	0.02	0.42
S49-11-7	65-88	B'22h	(*)	(*)	(*)	0.10	0.10	15.80	15.90	1	1.53	5.3	4.7	4.5	1.31	0.00	0.60
Gentry:																	
S49-21-1	0-7	A11	5.80	1.00	0.10	0.10	7.00	6.80	13.80	51	1.56	5.2	4.6	4.2	---	---	---
S49-21-2	7-24	A12	0.10	0.10	(*)	(*)	0.20	0.40	0.60	33	0.57	5.3	4.2	3.8	---	---	---
S49-21-3	24-37	B21t	10.50	2.90	0.10	(*)	13.50	6.00	19.50	69	0.12	5.9	5.4	4.5	---	---	---
S49-21-4	37-64	B22t	9.30	2.90	0.10	(*)	12.30	5.60	17.90	69	0.15	6.0	5.6	4.6	---	---	---
S49-21-5	64-80	Cg	2.70	0.70	(*)	0.00	3.40	1.50	4.90	69	0.01	6.4	6.2	5.2	---	---	---
Hontoon:																	
S49-13-1	0-5	0a1	28.80	9.30	1.30	0.10	39.50	189.60	1229.10	17	57.27	3.9	3.4	2.9	---	---	---
S49-13-2	5-17	0a2	15.10	8.40	1.20	0.30	25.00	260.90	285.90	9	50.86	3.2	3.0	2.4	---	---	---
S49-13-3	17-29	0a2	14.00	7.70	1.90	0.60	24.20	178.60	202.80	12	42.49	3.3	3.0	2.5	---	---	---
S49-13-4	29-41	0a3	27.30	8.90	1.20	0.10	37.50	186.20	223.70	17	55.12	4.0	3.5	3.0	---	---	---
S49-13-5	41-52	0a3	32.90	9.30	1.00	0.10	43.30	162.80	206.10	21	55.12	4.2	3.9	3.4	---	---	---

See footnote at end of table.

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Extractable bases					Extractable acidity	Cation exchange capacity	Base saturation	Organic carbon	pH			Pyrophosphate extractable		
			Ca	Mg	Na	K	Sum					H2O (1:1)	CaCl2 0.01M (1:2)	KC1 1N (1:1)	C	Fe	A1
Kaliga:																	
S49-14-1	0-7	0ap	3.40	2.50	0.50	0.10	6.50	127.20	133.70	5	36.92	4.0	3.7	3.4	---	---	
S49-14-2	7-17	0a2	4.20	3.20	0.70	0.10	8.20	165.80	174.00	5	51.53	3.8	3.4	3.2	---	---	
S49-14-3	17-26	0a2	8.70	7.90	0.80	1.00	18.40	126.20	144.60	13	55.75	4.3	3.9	3.5	---	---	
S49-14-4	26-32	IIIC1	2.40	1.30	0.20	(*)	3.90	29.50	33.40	12	4.96	4.7	4.0	3.8	---	---	
S49-14-5	32-37	IIIC2	0.60	0.40	0.10	(*)	1.10	2.30	3.40	32	0.26	5.2	4.3	4.0	---	---	
S49-14-6	37-45	IIIC3	6.40	8.20	0.50	0.20	15.30	15.90	31.20	49	0.43	5.3	4.4	3.5	---	---	
S49-14-7	45-53	IIIC3	4.60	5.70	0.40	0.20	10.90	10.80	21.70	50	0.24	5.6	4.4	3.6	---	---	
S49-14-8	53-65	IIIC4	3.20	3.70	0.30	0.20	7.40	7.40	14.80	50	0.21	5.8	4.6	3.9	---	---	
S49-14-9	65-80	IVC5	0.90	1.10	0.10	0.10	2.20	1.80	4.00	55	0.06	5.8	4.9	4.2	---	---	
Lokosee:																	
S49-28-1	0-4	A1	0.23	0.07	0.02	0.02	0.34	2.30	2.64	13	0.70	5.4	4.0	3.7	---	---	
S49-28-2	4-7	A21	0.03	0.02	0.02	0.01	0.08	0.06	0.68	12	0.18	6.4	4.8	4.3	---	---	
S49-28-3	7-27	A22	0.01	0.01	0.02	0.01	0.05	0.30	0.35	14	0.04	6.9	5.9	5.0	0.01	0.01	
S49-28-4	27-30	B1ir	0.02	0.02	0.03	0.01	0.08	0.60	0.68	12	0.05	6.0	5.2	4.7	0.07	0.05	
S49-28-5	30-35	B2ir	0.04	0.01	0.03	0.00	0.08	0.70	0.78	10	0.06	5.9	5.1	4.7	0.02	0.05	
S49-28-6	35-43	B'hir	1.04	0.05	0.04	0.01	1.14	4.30	5.44	21	0.32	5.9	5.0	4.7	0.16	0.12	
S49-28-7	43-49	A'2	0.72	0.06	0.04	0.01	0.83	1.50	2.33	36	0.11	5.0	5.0	4.5	---	---	
S49-28-8	49-57	B'2tg	3.63	0.40	0.10	0.02	4.15	3.80	7.95	52	0.16	5.0	4.3	3.8	---	---	
Myakka:																	
S49-10-1	0-7	A1	3.00	0.70	0.10	0.10	3.90	13.40	17.30	23	4.04	4.5	3.8	3.6	---	---	
S49-10-2	7-13	A2	0.80	0.20	(*)	(*)	1.00	3.60	4.60	22	0.93	4.6	3.7	3.5	---	---	
S49-10-3	13-27	A2	0.10	(*)	(*)	(*)	0.10	0.50	0.60	17	0.17	5.5	4.1	4.0	---	---	
S49-10-4	27-33	B21h	0.10	0.10	(*)	0.10	0.30	22.00	22.30	1	3.48	4.1	3.6	3.4	---	---	
S49-10-5	33-37	B22h	0.10	0.10	(*)	0.10	0.30	17.30	17.60	2	1.82	4.4	3.9	3.7	1.38	0.00	
S49-10-6	37-43	B3	(*)	(*)	(*)	0.10	0.10	3.90	4.00	3	0.47	4.7	4.1	3.9	---	---	
S49-10-7	43-70	A'2	(*)	(*)	(*)	(*)	(*)	0.80	0.80	---	0.11	5.0	4.4	4.3	---	---	
S49-10-8	70-82	B'23h	(*)	(*)	(*)	(*)	(*)	7.00	7.00	---	0.73	4.9	4.3	4.1	---	---	
Oldsmar:																	
S49-30-1	0-6	A1	0.32	0.11	0.03	0.06	0.52	9.70	10.22	5	2.18	4.0	3.3	2.9	---	---	
S49-30-2	6-11	A21	0.04	0.02	0.02	0.01	0.09	2.90	2.99	3	0.27	4.3	3.4	3.2	---	---	
S49-30-3	11-27	A22	0.01	0.01	0.02	0.00	0.04	0.40	0.44	9	0.09	5.7	4.3	3.8	---	---	
S49-30-4	27-43	A22	0.02	0.01	0.02	0.00	0.05	0.30	0.35	14	0.05	5.5	4.6	4.1	---	---	
S49-30-5	43-48	B21h	1.01	0.57	0.10	0.04	1.72	14.80	16.52	10	1.46	5.2	4.5	4.0	1.38	0.06	
S49-30-6	48-54	B22h	0.76	0.67	0.12	0.10	1.65	15.60	17.25	10	1.26	5.2	4.5	4.0	0.26	0.19	
S49-30-7	54-63	B3&Bh	0.75	0.76	0.14	0.17	1.82	14.00	15.82	12	0.77	5.3	4.5	4.1	0.39	0.39	
S49-30-8	63-67	A'2	0.47	0.61	0.09	0.08	1.25	3.40	4.65	27	0.13	5.7	4.5	4.2	0.00	0.02	
S49-30-9	67-77	B'21tg	1.88	2.18	0.31	0.23	4.60	7.10	11.70	39	0.26	5.3	4.5	4.3	0.12	---	
S49-30-10	77-80	B'22tg	2.29	2.72	0.44	0.14	5.59	8.40	13.99	40	0.20	5.6	4.3	3.7	0.02	---	
Paola:																	
S49-6-1	0-3	A1	0.31	0.27	(*)	0.10	0.68	3.24	3.92	17	2.04	4.0	3.1	2.9	---	---	
S49-6-2	3-6	A21	0.13	(*)	(*)	(*)	0.13	0.05	0.18	72	0.06	4.8	4.0	4.0	---	---	
S49-6-3	6-16	A22	(*)	(*)	(*)	(*)	(*)	0.02	0.02	18	0.05	5.0	4.2	4.2	---	---	
S49-6-4	16-25	B&A22	(*)	(*)	(*)	0.06	0.06	0.34	0.28	11	0.14	4.9	4.7	4.5	---	---	
S49-6-5	25-43	B&A22	0.07	(*)	(*)	(*)	0.07	0.14	0.21	33	0.09	5.2	4.8	4.6	---	---	
S49-6-6	43-80	B	(*)	(*)	(*)	0.06	0.06	0.17	0.23	26	0.03	5.4	4.9	4.6	---	---	

See footnote at end of table.

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Extractable bases					Extractable acidity	Cation exchange capacity	Base saturation	pH			Pyrophosphate extractable				
			Ca	Mg	Na	K	Sum				H ₂ O (1:1)	CaCl ₂ 0.01M (1:2)	KC1 1N (1:1)	C	Fe	A1		
Placid:			-----Meg/100g-----															
S49-24-1	0-14	A11	0.50	0.20	0.10	(*)	0.80	9.20	10.00	8	1.92	4.4	3.7	3.3	---	---	---	---
S49-24-2	14-24	A12	0.10	0.10	(*)	0.00	0.20	3.50	3.70	5	6.87	4.7	3.9	3.6	---	---	---	---
S49-24-3	24-36	C1	(*)	(*)	(*)	(*)	(*)	0.00	---	---	0.12	5.9	5.2	4.4	---	---	---	---
S49-24-4	36-50	C2	(*)	0.00	(*)	(*)	(*)	0.00	---	---	0.08	6.4	5.6	4.6	---	---	---	---
S49-24-5	50-80	C3	0.00	(*)	(*)	(*)	(*)	0.00	---	---	0.06	6.3	5.7	4.8	---	---	---	---
Samsula:			-----Meg/100g-----															
S49-19-1	0-8	Oa1	3.60	1.00	0.60	0.50	5.70	134.70	140.40	4	46.90	3.9	3.5	3.3	---	---	---	---
S49-19-2	8-14	Oa2	2.40	0.80	0.50	0.50	4.20	130.40	134.60	3	43.60	4.3	3.7	3.5	---	---	---	---
S49-19-3	14-22	Oa2	2.00	0.40	0.30	0.30	3.00	112.80	115.80	3	31.90	4.8	3.9	3.8	---	---	---	---
S49-19-4	22-39	IIAb	0.30	0.10	0.10	0.10	0.60	14.20	14.80	4	2.54	5.0	4.2	4.1	---	---	---	---
S49-19-5	39-65	IIcb	0.10	(*)	(*)	(*)	0.10	1.70	1.80	6	0.23	5.6	4.6	4.5	---	---	---	---
Satellite:			-----Meg/100g-----															
S49-9-1	0-8	A	0.30	0.10	(*)	(*)	0.40	1.60	2.00	20	0.49	4.9	3.8	3.7	---	---	---	---
S49-9-2	8-20	C1	(*)	(*)	(*)	(*)	(*)	0.30	0.30	---	0.10	5.8	4.3	4.1	---	---	---	---
S49-9-3	20-30	C2	(*)	(*)	(*)	(*)	(*)	0.30	0.30	---	0.13	5.8	4.3	4.2	---	---	---	---
S49-9-4	30-48	C3	(*)	(*)	(*)	(*)	(*)	0.20	0.20	---	0.13	6.1	4.7	4.6	---	---	---	---
S49-9-5	48-80	C4	(*)	(*)	(*)	(*)	(*)	0.50	0.50	---	0.16	5.6	4.1	3.8	---	---	---	---
Smyrna:			-----Meg/100g-----															
S49-29-1	0-4	A11	1.25	0.53	0.07	0.09	1.94	9.40	11.34	17	2.36	4.4	3.5	3.1	---	---	---	---
S49-29-2	4-7	A12	0.49	0.20	0.02	0.02	0.73	4.80	5.53	13	1.00	4.6	3.4	3.2	---	---	---	---
S49-29-3	7-14	A2	0.07	0.03	0.00	0.00	0.10	0.60	0.70	14	0.14	5.6	4.2	3.7	---	---	---	---
S49-29-4	14-17	B21h	0.27	0.19	0.06	0.05	0.57	22.30	22.87	2	2.99	4.6	3.9	3.7	1.82	0.01	0.31	0.85
S49-29-5	17-20	B22h	0.14	0.06	0.03	0.01	0.24	26.50	26.74	1	2.28	5.0	4.2	4.1	2.22	0.02	0.85	0.36
S49-29-6	20-25	B3&Bh	0.02	0.18	0.02	0.00	0.22	7.40	7.62	3	0.58	5.7	4.7	4.5	0.54	0.01	0.36	0.85
S49-29-7	25-43	A'21	0.00	0.00	0.00	0.00	0.00	0.80	0.80	---	0.11	6.6	5.6	4.9	---	---	---	---
S49-29-8	43-56	A'22	0.03	0.14	0.02	0.00	0.19	2.00	2.19	9	0.21	5.8	5.2	4.8	---	---	---	---
S49-29-9	56-69	B'21h	0.03	0.01	0.01	0.00	0.05	6.00	6.05	1	0.54	5.5	4.9	4.7	0.56	0.01	0.32	0.65
S49-29-10	69-80	B'22h	0.01	0.02	0.03	0.00	0.06	14.80	14.86	<1	0.77	5.5	4.8	4.5	0.84	0.01	0.65	0.65
St Lucie:			-----Meg/100g-----															
S49-7-1	0-4	A1	0.90	0.18	(*)	0.08	1.16	1.16	2.32	50	1.02	4.9	3.9	3.7	---	---	---	---
S49-7-2	4-13	C1	0.16	(*)	(*)	(*)	0.16	0.09	0.25	64	0.12	4.3	3.9	4.1	---	---	---	---
S49-7-3	13-28	C2	0.09	(*)	(*)	(*)	0.09	0.03	0.12	75	0.01	5.5	3.9	3.9	---	---	---	---
S49-7-4	28-43	C3	0.05	(*)	(*)	(*)	0.05	0.02	0.07	71	0.01	5.8	4.5	4.5	---	---	---	---
S49-7-5	43-80	C4	0.13	(*)	(*)	(*)	0.13	0.02	0.15	87	0.01	6.0	4.6	4.6	---	---	---	---

See footnote at end of table.

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Extractable bases					Extracatable acidity	Cation exchange capacity	Base saturation	pH			Pyrophosphate extractable		
			Ca	Mg	Na	K	Sum				H2O (1:1)	CaCl2 (0.01M) (1:2)	KC1 (1:1)	C	Fe	A1
In			Meq/ 100g							Pct	Pct		Pct	Pct	Pct	
Vero:																
S49-16-1	0-7	A11	2.30	1.90	0.40	0.20	4.80	20.50	25.00	19	6.05	4.1	3.4	3.0	---	---
S49-16-2	7-10	A12	0.20	0.40	0.40	(*)	1.00	5.50	6.50	15	2.03	4.2	3.2	2.9	---	---
S49-16-3	10-21	A2	(*)	(*)	0.10	(*)	0.10	0.00	0.10	100	0.11	5.5	4.4	4.1	---	---
S49-16-4	21-24	B21h	0.40	0.60	0.40	(*)	1.40	0.90	2.30	61	0.30	6.9	5.3	5.7	0.24	0.02
S49-16-5	24-28	B22h	2.70	4.30	0.30	0.10	7.40	4.50	11.90	62	1.54	6.9	5.8	5.8	1.36	0.12
S49-16-6	28-32	B21t	1.50	2.80	0.30	(*)	4.60	2.20	6.80	68	0.00	7.3	6.2	6.2	---	---
S49-16-7	32-40	B22tg	1.80	5.90	0.70	0.10	8.50	3.20	11.70	73	0.29	7.4	7.1	5.9	---	---
S49-16-8	40-48	B22tg	1.30	5.10	0.70	0.10	7.20	2.50	9.70	74	0.43	7.4	0.9	6.3	---	---
S49-16-9	48-55	B23tg	1.20	5.20	0.70	0.10	7.20	2.50	9.70	74	0.22	7.6	7.1	6.5	---	---
S49-16-10	55-62	B23tg	1.30	5.80	0.70	0.10	7.90	2.60	10.50	75	0.20	7.9	7.3	6.8	---	---
S49-16-11	62-80	C1g	1.20	3.10	0.60	0.10	5.00	2.80	7.80	64	0.15	8.2	7.6	7.1	---	---
S49-16-12	80-99	C2g	1.10	4.70	0.50	0.10	6.40	2.40	8.80	73	0.10	8.6	7.9	7.4	---	---
Wauchula:																
S49-12-1	0-8	A1	0.50	0.70	0.10	0.10	1.40	11.80	13.20	11	3.09	4.0	3.2	2.8	---	---
S49-12-2	8-11	A21	0.10	0.10	(*)	(*)	0.20	1.80	2.00	10	0.46	4.7	3.5	3.3	---	---
S49-12-3	11-28	A22	(*)	(*)	(*)	(*)	(*)	0.50	0.50	--	0.90	5.8	4.3	4.2	---	---
S49-12-4	28-33	B21h	0.10	0.30	0.10	0.10	0.60	32.60	33.20	2	4.20	4.1	3.4	3.2	3.06	0.03
S49-12-5	33-37	B22h	(*)	0.10	0.10	(*)	0.20	26.40	26.60	1	2.21	4.6	4.0	3.8	1.92	0.03
S49-12-6	37-41	A'2&Bh	---	---	---	---	---	---	---	---	2.29	4.8	4.1	3.9	---	---
S49-12-7	41-54	B'2tg	0.10	0.10	0.10	(*)	0.30	27.90	28.20	1	---	---	---	---	---	---
S49-12-8	54-82	C'g	0.10	1.80	0.20	(*)	2.10	6.30	8.40	25	0.19	4.9	4.0	3.8	---	---

*Less than 0.05 milliequivalents per 100 grams.

TABLE 20.--CLAY MINERALOGY OF SELECTED SOILS

Soil series and sample numbers	Depth	Horizon	Percentage of clay minerals				
			Mont- morillonite	14Å intergrade	Kaolinite	Gibbsite	Quartz
	<u>In</u>						
Adamsville:							
S49-17-1-----	0-4	A1	0	34	16	0	50
S49-17-3-----	16-33	C2	0	30	9	0	61
S49-17-4-----	33-55	C3	0	21	13	0	66
Ankona:							
S49-32-1-----	0-5	A11	0	0	0	0	100
S49-32-5-----	32-36	B21h	0	0	0	0	100
S49-32-8-----	47-51	B21t	0	11	84	0	5
Candler:							
S49-5-1-----	0-3	A1	0	34	34	6	26
S49-5-2-----	3-6	A21	0	39	23	12	26
S49-5-4-----	17-35	A23	0	36	22	15	27
Gentry:							
S49-21-1-----	0-7	A11	9	(*)	5	0	86
S49-21-2-----	7-24	A12	77	14	2	0	7
S49-21-3-----	24-37	B21t	85	7	(*)	0	8
S49-21-5-----	64-80	Cg	97	0	1	0	2
Kaliga:							
S49-14-4-----	26-32	IIC1	0	22	6	0	72
S49-14-9-----	65-80	IVC5	76	0	9	0	15
Lokosee:							
S49-28-1-----	0-4	A1	0	22	9	0	69
S49-28-5-----	30-35	B21r	0	14	9	0	77
S49-28-8-----	49-57	B'2tg	0	6	87	0	7
Oldsmar:							
S49-30-1-----	0-6	A1	0	2	10	0	88
S49-30-5-----	43-54	B21h	0	2	10	0	88
S49-30-9-----	67-77	B'21tg	54	0	36	0	10
Paola:							
S49-6-2-----	3-6	A21	0	12	11	0	77
S49-6-3-----	6-16	A22	0	10	12	0	78
S49-6-4-----	16-25	B&A22	0	26	14	0	60
S49-6-5-----	25-43	B&A22	0	33	18	0	49
S49-6-6-----	43-80	B	0	20	8	0	71
Placid:							
S49-24-1-----	0-14	A11	0	(*)	(*)	0	100
S49-24-3-----	24-36	C1	7	27	28	0	38
S49-24-5-----	50-80	C3	0	20	16	0	64
Samsula:							
S49-19-4-----	22-39	IIAb	10	30	10	0	50
S49-19-5-----	39-65	IICb	15	13	5	0	67
Smyrna:							
S49-29-1-----	0-4	A11	0	13	4	0	83
S49-29-4-----	14-17	B21h	0	6	5	0	89
S49-29-8-----	43-56	A'22	0	6	10	0	84
S49-29-10-----	69-80	B'22h	0	4	27	0	69
Vero:							
S49-16-1-----	0-7	A11	0	0	0	0	100
S49-16-4-----	21-24	B21h	5	28	16	0	51
S49-16-6-----	28-32	B21t	15	27	22	0	36
S49-16-10-----	55-62	B23tg	10	10	75	0	5
S49-16-11-----	62-80	C1g	78	6	10	0	6

*Less than 0.05 milliequivalents per 100 grams.

TABLE 21.--ENGINEERING TEST DATA

[Tests performed by the Florida Department of Transportation (FDOT) in cooperation with the U.S. Bureau of Public Roads, in accordance with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO) (1). NP means nonplastic]

Soil name and location	FDOT report number	Depth	Moisture density**		Mechanical analysis**							Plasticity Index	AASHTO ***	Unified ****
			Maximum dry density	Optimum moisture content	Percentage passing sieve--			Percentage smaller than--						
					No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			
Adamsville fine sand: About 200 feet east of Pleasant Hill and Southport Road intersection. SW1/4NW1/4 sec. 8, T. 27 S., R. 29 E.	41 42 43	In 0-4 4-33 33-80	Pcf 104.0 108.3 106.1	Pct 13.9 11.6 15.1	100 100 100	90 89 90	8 5 4	5 3 3	1 1 1	1 0 0	0 0 0	NP NP NP	A-3(0) A-3(0) A-3(0)	SP-SM SP-SM SP
Ankona fine sand: About 900 feet east and 1,200 feet south of private Russell Ranch Road and U.S. Hwy. 441 intersection, about 5 miles south of Kenansville, Fla. NW1/4SW1/4 sec. 15, T. 31 S., R. 34 E.	90 91 92 93	0-9 9-32 32-40 47-80	95.1 101.3 102.3 110.2	18.8 13.4 14.1 12.2	100 100 100 100	98 93 93 92	10 5 17 28	5 2 10 25	1 0 1 22	0 0 0 20	0 0 0 19	NP NP NP 15	A-3(0) A-3(0) A-2-4(0) A-2-6(6)	SP-SM SP-SM SM SC
Candler sand: About 250 feet south of Sand Hill Road and 1,400 feet west of Fla. Hwy. 545. NW1/4NW1/4 sec. 22, T. 25 S., R. 26 E.	11, 12	17-80	103.0	13.9	100	91	3	3	3	3	3	NP	A-3(0)	SP
Cassia fine sand: About 1 mile southeast of Holopaw, Fla., 6 miles east of U.S. Hwy. 441 and 8 miles south of U.S. Hwy. 192. SW1/4SE1/4 sec. 13, T. 27 S., R. 32 E.	21 22 23	3-20 20-25 28-53	97.9 97.8 103.2	15.5 14.5 14.2	100 100 100	98 97 98	4 10 5	3 6 3	1 1 1	0 0 0	0 0 0	NP NP NP	A-3(0) A-3(0) A-3(0)	SP SP-SM SP-SM
Gentry fine sand: About 1.75 miles southeast of Lake Russell, 1.9 miles west of South Port Canal and 5.5 miles south of Kissimmee Park. SE1/4SW1/4 sec. 23, T. 27 S., R. 29 E.	49 50 51	7-24 24-64 64-80	113.4 113.6 107.1	14.6 13.6 10.3	100 100 100	99 99 97	20 22 8	18 21 7	14 16 5	11 15 4	9 13 3	NP 26 NP	A-2-4(0) A-2-4(0) A-3(0)	SM SC SP-SM

See footnotes at end of table.

TABLE 21.--ENGINEERING TEST DATA--Continued

Soil name and location	FDOT report number	Depth	Moisture density**		Mechanical analysis**							Liquid limit	Plasticity index	Classification		
			Maximum dry density	Optimum moisture content	Percentage passing sieve--				Percentage smaller than--							
					No. 10 (2.0 mm)	No. 40 (0.425 mm)	No. 200 (0.075 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO ***	Unified ****	
		In	Pcf	Pct												
Kaliga muck: About 1,700 feet south of Fla. Hwy. 525 and 0.8 mile east of Fla. Hwy. 525A. SW1/4NW1/4 sec. 28, T. 26 S., R. 30 E.	27 28 29 30	26-37 37-53 53-65 65-80	85.2 84.8 101.9 113.6	25.3 19.9 19.5 13.6	100 100 100 100	100 100 100 100	40 66 42 27	36 61 39 24	25 52 33 18	14 43 23 13	7 37 18 11	NP 54 25 NP	A-4(0) A-7(23) A-4(0) A-2-4(0)	SM CH SC SM		
Lokosee fine sand: About 2 miles southeast of where Canal C-36 enters Lake Hatchineha. SE1/4NE1/4 sec. 28, T. 28 S., R. 32 E.	69 70 71 72 73	0-4 4-27 27-35 35-43 49-57	100.7 102.8 105.4 112.4 112.3	14.4 12.6 12.4 11.8 9.3	100 100 100 100 100	98 98 99 98 99	6 4 7 11 20	2 1 4 9 17	0 0 2 6 14	0 0 1 3 14	0 0 0 2 14	NP NP NP NP 5	A-3(0) A-3(0) A-3(0) A-2-4(0) A-2-4(0)	SP-SM SP SP-SM SP-SM SM-SC		
Myakka fine sand: About 4 miles west of Holopaw, Fla., and 25 feet south of U.S. Hwy. 441. SW1/4NE1/4 sec. 32, T. 26 S., R. 32 E.	18 19 20	7-27 27-37 43-70	97.8 94.9 101.7	15.9 15.7 14.7	100 100 100	98 98 99	3 9 4	2 6 3	0 2 1	0 0 0	0 0 0	NP NP NP	A-3(0) A-3(0) A-3(0)	SP SP-SM SP		
Oldsmar fine sand: About 2,000 feet south of Southport Park on Lake Tohopekaliga. NE1/4SW1/4 sec. 13, T. 27 S., R. 29 E.	80 81 82 83 84	0-6 6-43 43-54 54-63 69-80	99.3 99.2 105.1 107.0 109.4	14.1 15.7 18.9 12.7 11.3	100 100 100 100 100	100 100 100 100 100	9 9 15 18 29	4 2 11 14 26	0 0 6 10 22	0 0 3 8 21	0 0 1 7 20	NP NP NP NP 15	A-3(0) A-3(0) A-2-4(0) A-2-4(0) A-2-6(0)	SP-SM SP-SM SM SM SC		
Paola sand: About 0.75 mile south of U.S. Hwy. 192 and 0.5 mile east of I-4. SW1/4NW1/4 sec. 18, T. 25 S., R. 28 E.	13	25-43	107.5	12.1	100	87	4	4	2	2	2	NP	A-3(0)	SP		
Placid fine sand: About 0.6 mile south of wood bridge on Foderstack Slough and 165 feet west of dirt road. SE1/4NE1/4 sec. 13, T. 30 S., R. 32 E.	58 59	14-24 24-80	96.2 97.0	15.7 18.8	100 100	100 100	13 3	6 1	0 0	0 0	0 0	0 0	A-2-4(0) A-3(0)	SM SP		
Samsula muck: About 1 mile east of Lake Lizzie and 0.75 mile south of Trout Lake. SE1/4NE1/4 sec. 12, T. 26 S., R. 31 E.	47 48	22-39 39-65	104.7 103.7	13.7 15.1	100 100	99 100	7 4	5 3	2 1	1 0	1 0	NP NP	A-3(0) A-3(0)	SP-SM SP		

TABLE 21.--ENGINEERING TEST DATA--Continued

Soil name and location	FDOT report number	Depth	Moisture density*		Mechanical analysis**							Liquid limit	Plasticity index	Classification	
			Maximum dry density	Optimum moisture content	Percentage passing sieve--			Percentage smaller than--							
					No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm				
Satellite sand: About 200 feet north of Sullivan Road and Fla. Hwy. 532 intersection and 10 feet east of Sullivan Road. SW1/4 sec. 36, T. 25 S., R. 27 E.	17	20-48	P _{ef} 100.4	P _{et} 13.9	100	92	2	1	0	0	0	NP	A-3(0)	SP	
Smyrna fine sand: About 1.5 miles northwest of Pleasant Hill Road and Cypress Boulevard intersection. SE1/4NE1/4 sec. 11, T. 27 S, R. 18 E.	74 75 76 77 78 79	0-7 7-14 14-18 18-25 25-43 56-69	99.6 102.3 100.0 106.9 107.4 106.7	15.3 18.7 15.5 12.3 13.7 18.9	100 100 100 100 100 100	95 95 96 95 95 95	8 6 13 5 7 16	3 3 6 3 4 12	0 1 0 1 0 5	0 0 0 1 0 2	0 0 0 0 0 1	NP NP NP NP NP NP	A-3(0) A-3(0) A-2-4(0) A-3(0) A-3(0) A-2-4(0)	SP-SM SP-SM SM SP-SM SP-SM SM	
St. Lucie fine sand: About 150 feet south of Fla. Hwy. 532, 1.5 miles south of Lake Preston, and 1.25 miles southeast of Lake Joel. NW1/4NE1/4 sec. 32, T. 25 S., R. 31 E.	1	8-72	95.8	15.9	100	97	2	2	2	0	0	NP	A-3(0)	SP	
Vero fine sand: On Gulf American Corp. property near the north end of Johnson Island. NW1/4NW1/4 sec. 34, T. 26 S., R. 28 E.	36 37 38 39 40	0-7 7-21 21-28 32-62 62-99	90.1 101.6 109.1 109.7 113.4	22.5 14.9 13.0 16.8 13.8	100 100 100 100 100	96 96 96 97 97	21 13 19 42 31	12 8 13 37 27	1 0 5 31 20	0 0 3 29 19	0 0 2 28 18	NP NP NP NP NP	A-2-4(0) A-2-4(0) A-2-4(0) A-6(16) A-2-6(1)	SM SP-SM SM SC SC	
Wauchula fine sand: On Gulf American Corp. property near the north end of Johnson Island. NE1/4NW1/4 sec. 34, T. 26 S., R. 28 E.	24 25 26	11-28 28-37 54-82	102.0 102.0 114.5	14.2 13.9 13.7	100 100 100	94 95 95	9 21 25	4 13 22	0 4 16	0 2 15	0 1 15	NP NP NP	A-3(0) A-2-4(0) A-2-4(0)	SP-SM SM SM	

*Based on AASHTO Designation T99-70 (1).

**Mechanical analyses according to AASHTO designation T88-70 (1). Results by this procedure differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-sized fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-sized fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

***Based on AASHTO Designation M 145-66 (1).

****Based on ASTM Standard D 2487-69(2).

TABLE 22.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Adamsville-----	Hyperthermic, uncoated Aquic Quartzipsamments
Adamsville Variant-----	Hyperthermic, uncoated Aquic Quartzipsamments
Arents-----	
Ankona-----	Sandy, siliceous, hyperthermic, ortstein Arenic Haplaquods
Basinger-----	Siliceous, hyperthermic Spodic Psammaquents
Candler-----	Hyperthermic, uncoated Typic Quartzipsamments
Cassia-----	Sandy, siliceous, hyperthermic Typic Haplohumods
Delray-----	Loamy, mixed, hyperthermic Grossarenic Argiaquolls
EauGallie-----	Sandy, siliceous, hyperthermic Alfic Haplaquods
Floridana-----	Loamy, siliceous, hyperthermic Arenic Argiaquolls
Gentry-----	Loamy, siliceous, hyperthermic Arenic Argiaquolls
Holopaw-----	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Hontoon-----	Dysic, hyperthermic Typic Medisaprists
Immokalee-----	Sandy, siliceous, hyperthermic Arenic Haplaquods
Kaliga-----	Loamy, mixed, dysic, hyperthermic Terric Medisaprists
Lokosee-----	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Malabar-----	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Myakka-----	Sandy, siliceous, hyperthermic Aeris Haplaquods
Narcoossee-----	Sandy, siliceous, hyperthermic Entic Haplohumods
Nittaw-----	Fine, montmorillonitic, hyperthermic Typic Argiaquolls
Oldsmar-----	Sandy, siliceous, hyperthermic Alfic Arenic Haplaquods
Ona-----	Sandy, siliceous, hyperthermic Typic Haplaquods
Paola-----	Hyperthermic, uncoated Spodic Quartzipsamments
Parkwood-----	Coarse-loamy, mixed, hyperthermic Mollic Ochraqualfs
Pineda-----	Loamy, siliceous, hyperthermic Arenic Glossaqualfs
Placid-----	Sandy, siliceous, hyperthermic Typic Humaquepts
Placid Variant-----	Sandy, siliceous, hyperthermic Quartzipsammentis Haplumbrepts
Pomello-----	Sandy, siliceous, hyperthermic Arenic Haplohumods
Pomona-----	Sandy, siliceous, hyperthermic Ultic Haplaquods
Pompano-----	Siliceous, hyperthermic Typic Psammaquents
Riviera-----	Loamy, siliceous, hyperthermic Arenic Glossaqualfs
Samsula-----	Sandy or sandy-skeletal, siliceous, dysic, hyperthermic Terric Medisaprists
Satellite-----	Hyperthermic, uncoated Aquic Quartzipsamments
Smyrna-----	Sandy, siliceous, hyperthermic Aeris Haplaquods
St. Lucie-----	Hyperthermic, uncoated Typic Quartzipsamments
Tavares-----	Hyperthermic, uncoated Typic Quartzipsamments
Vero-----	Sandy over loamy, siliceous, hyperthermic Alfic Haplaquods
Wauchula-----	Sandy, siliceous, hyperthermic Ultic Haplaquods
Winder-----	Fine-loamy, siliceous, hyperthermic Typic Glossaqualfs

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